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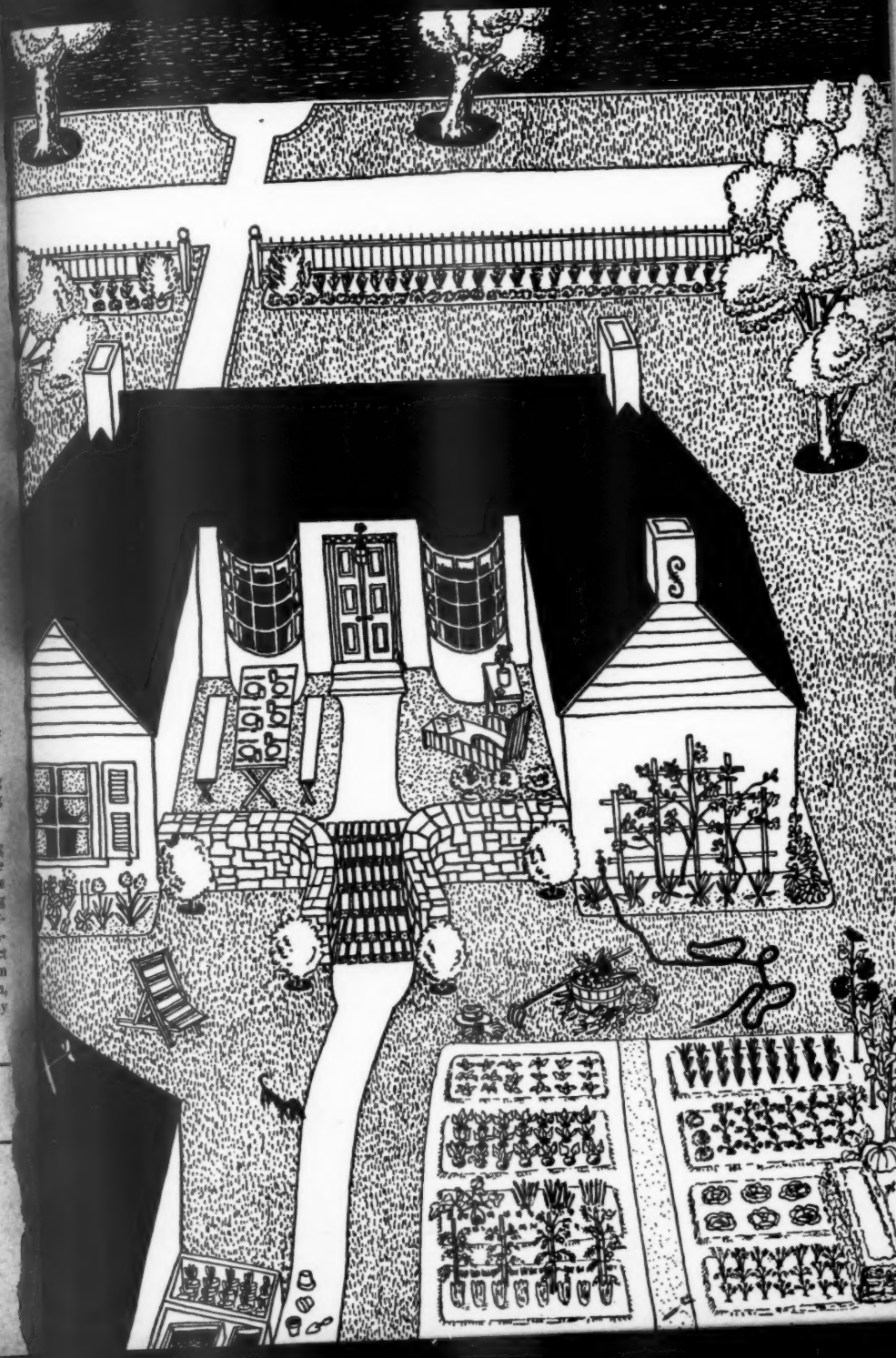

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FORUM

COMPOSTERS

Dear Mr. Rodale:

If you think Sir Albert Howard was joking when he referred to the ground eating up a corn knife, listen to this.

A pie tin in the bottom of our garbage can was inadvertently thrown into our collection pile and built into the compost. We found the rolled rim only. The center was gone.

I keep a potting and seeding starter supply of compost in a 50 pound lard can for winter use. This spring when emptied it was discovered that the bottom of the can was eaten away.

We raise beautiful celery in a trench filled with compost. The plants are stored in the cellar with large amount of composted dirt clinging to the roots. The burlap bags at the bottom of the box disappear completely and the sides of the box are good for kindling; bottoms rotted out by the compost and moisture.

It has been our experience that one third compost is too rich a seeding box mixture. We use one part sifted compost to three, four, or five parts of sand. We put the compost in the bottom of the flat (on top of a layer of burlap for drainage) and the sand on top. This helps cut down damping off and "calls down" the roots.

The whole family engages in composting. Daddy does the spade and fork work. Mother supervises the purchasing of the horse manure, lime, and saves garbage. Our nine year old boy loads the wheelbarrow (you have the picture for this) collecting material from our half-acre lot. He is using this as a 4-H project. The five year old boy is a good weeder and collects the weedings of the others, also picks up behind the cultivator. Even the 3 year old, upon finding an earthworm, picks it up and calls out, "I'll take him to the compote and let him eat his dinner."

I know we all have cheaper, healthier, and tastier dinners since we started composting.

Frances Fenner
14 Orchard St.
Afton, N. Y.

●

SUGGESTION

Just a few lines to express my appreciation and thanks for the booklet on "Compost and How To Make It" together with the seven issues of Organic Gardening, which interested me immensely as do all topics on farming. Being reared on a farm in southern Ohio 61 years ago, I again plan to acquire at least 10 acres of land in some favorable locality where the soil is not worn out, so I may make a comfortable living away from the turmoil of a city, with quiet and contentment with some hunting and fishing thrown in.

At this point I am offering a suggestion which seems rather logical in the way of preparing various materials for the compost heap, and that is for a community of farmers or gardeners to band together and purchase a piece of power equipment either new or second hand, something like corn shredder or an ensilage cutter, this I believe would reduce to pulp practically all material suitable for compost, including dry cornstalks and small tree limbs, by so breaking down the fiber would cause the whole mass to disintegrate much faster and become available for use sooner, and besides occupying less space in the bin.

R. C. Chunn,
6324 Marconi St.,
Huntington Park, Cal.

ANTIBIOTICS

I have a hunch that the vitamin content of organically grown vegetables is not the really important factor. The more I think about it, the more I read about it, the more convinced I become that the real reason why organic fertilizers are so important is that they supply the plant with anti-biotics. These substances which have been found to have such miraculous curative properties in connection with human diseases must surely have similar curative properties for plant diseases. I am convinced that it will be found that the plant absorbs these anti-biotics into its structure and thus protects itself against disease. And is it going too far into the realm of speculation to wonder if, when we consume the plant, we, in turn, absorb into our system, these same anti-biotics or some derivative of them and so immunize ourselves against disease?

Leonard Wickenden,
Consulting Chemist
120 Wall Street,
New York 5, N. Y.

●

FLOWERS AND PESTS

I received a circular from the Burgess Seed Co. in which they state that when troubled with moles in your Tulip beds to plant Daffodil bulbs among them and the moles won't bother the beds. A patient who raises gladiolus tells me that Jonquils planted around will also keep the moles out. I thought that your readers might like to know this. A few bulbs planted around in the garden would brighten the place as well as serving a useful purpose.

I have for two years planted a border of *Nasturtium* seeds around our garden and scattered poppy seeds throughout the garden and it helps keep the bugs out of the vegetables. We use compost and no sprays of any kind. If the above two flowers keep bugs out there must be other flowers that would do the same thing for the different kinds of bugs. Some of the old timers always plant a row of flowers in their gardens with their vegetables.

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I wish that you would send out the call to your readers and find out what flowers they use and for what bugs. Then you could write a booklet telling us all about the different flowers and what bugs they chase away from our vegetables.

I have seventy-seven acres of land right in town. I have an old manure heap (cow and horse) which has been laying there for thirty years. It would do your compost heart good to see that material. When you mix that with the ground and drop in a seed you have to jump back so that the growing plant won't hit you on the way up. I have started a worm farm for myself, using large night crawlers or dew worms. Besides using them for fishing of which we have plenty, I put a handful of worms in whenever and wherever I plant anything. They go in with the compost and seeds.

Thanks for everything.

Derk Stuive, D.C.
112 West State St.,
Hastings, Mich.

●

VEGETABLES

Though a recent subscriber *without* a garden of any kind, I can't wait for each new issue to arrive, to me it is most fascinating and satisfying literature.

Your article, A Few Vegetables and What to do With Them, causes me to write and perhaps add a little to their usage. I miss these four vegetables, or rather three, celeriac, salsify and leek.

Leek, we usually cooked in clear stock mostly lamb or mutton and beef, or added in soups made of these, especially when barley or potatoes were also cooked with it. As a creamed vegetable with beef or lamb and even pork roast, it was usually simmered tender, a hollandaise sauce of which a part was this leek-broth and cream or topmilk, with an egg beaten into it, was unexcelled. Some added a pinch of nutmeg or mace before it was poured over the leek. Salsify was more often than not cooked in meat stock

and later creamed and I know of none who refused it with any roasts. Celeriac you cooked tender with boiling beef and from the stock made any number of soups or served it clear.

The root was then cooled and a salad made, with just a bit of grated onion in just plain salad oil and vinegar (or lemon). *Ladies* by the way never mentioned the fact that they loved eating celeriac because of this reputation of increasing man's erotic powers. I wish I could enlighten you as to this source of reputation, it seems lost in antiquity, but everybody knows it and some simply used it intentionally. (I mean people, not especially ladies only).

My other reason for writing is, how about becoming a member of your book club?

Hope that some day I will be a gardener as one should be, though I am far along in years and wonder myself if I ever will, even for a little while. Thanks for a grand magazine.

(Mrs.) Karla C. Gulealke
1320 So. 5th Street,
Omaha, Nebraska

●

DEEP SOIL IS NEEDED

Here are two illustrations of this fact, one an observation of the lawn, and the other in the vegetable garden.

The lawn where I live was made over the foundations of a former house, but thirty years later it is still possible to see the outline of the old cellar walls in dry weather. The grass grows better and stays green longer both inside and outside of the old cellar than it does over the walls. It is obvious that there was not enough soil over the walls, but I wanted to know how much is not enough. I expected to find stone within a few inches of the top of the ground, but instead, when I probed with a rod, there was no place where the rod did not go down easily at least a foot.

We usually think of grass roots as being close to the surface, for that is where we find most of them when we take up the turf. But the only explan-

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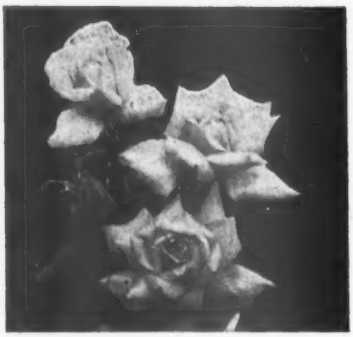

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ation of this observation which seems reasonable, is that some roots penetrate deeply into the subsoil and bring up something of value. Whether the material these roots bring up is merely water, or whether it is also valuable nutriment is uncertain. Perhaps more surprising is the fact that the roots will not go around such a narrow obstruction as an old cellar wall.

We have often seen men remove a few inches of the top soil of a lawn and replace these few inches with rich loam. Sometimes the result is a lawn but little, if any, better than the old. It may be that in these cases the trouble in the first place was two or more feet below the surface.

The other example was in my vegetable garden. One corner of the garden did not produce the crops that it should, even though the top eight inches was good loam, rich in organic material. In the spring of 1944 I dug a trench across this section, about two feet deep and one foot wide. I filled this trench with garden rubbish, leaves, last year's perennials, prunings from the shrubs, and other material, enough so that when it was packed down it was level with the soil around it. I then covered it with the soil removed, and the balance of the soil was mixed with the garden nearby. Then I planted a row of lima beans on each side of the trench.

In 1944 no result was observed. The beans did just as well as those nearby, but no better. But in 1945 the result was conspicuous. In that year I planted corn, and the stalks were more vigorous, and the yield at least twice as much over or close to the trench than it was at a little distance. It is too early to see the result in 1946.

Of course this does not show that I used the best method of treating the subsoil, but it does show that with the top eight inches just the same, the conditions further down are very important. We need organic material in the top soil, but we need it down below also.

A. W. Forbes,
Worcester, Mass.

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Organic Gardening

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Ground Up Leaves

FOR many years I had the idea of getting my farm-hand to run some leaves through our hammer-mill but it never got done, what with a war on and a shortage of help. A few months ago I came to the realization that the war was over and it was about time to grind up some leaves, to see how good a job of grinding our hammer-mill would do. Pretty near every good-sized farm owns such a mill which costs from about eighty to $150, and it is used to grind up corn and other feeds for the cattle. As I said, the war was over and the farmer was in a better mood. We had some piles of leaves but they were wet and took a bit of drying. He then put them through the machine. Here and there he had a little trouble because he encountered a mass that hadn't dried thoroughly. He's a smart farmer so he ran some dry straw along with it and the trick worked.

I was amazed. The pictures will show you what happened. It produced a mass of finely pulverized leaf material. If mixed with a little topsoil and kept very wet decay should take place in a month or two, an extremely short time for producing leaf-mold. It would pay the nursery people to experiment with this idea because leaf-mold is so extensively used by them and it would drastically cut its cost.

It might even pay farmers to consider grinding up leaves every fall and disc it into the land. By spring it would be absolutely decayed. For orcharding purposes it might be a specific, because in nature trees depend on falling leaves for their principal nutriment. I like leaves as a soil amendment because the roots of trees descend much further than those of weeds, usually from 25 to 50 feet and bring up into the leaves the unexhausted mineral elements which exist in those substratas.

In the U. S. Dept. of Agriculture 1938 Yearbook called *Soils and Men*, on page 516 it is stated, "Leaves alone, when dry, are about twice as rich per pound in plant food as barnyard manure." From experience it is known that remarkable results are produced in gardening with leaf-mold. The leaf is a factory, a crucible in which all the nutritive elements work to make fruit, blossoms, seed, etc. It is an extremely rich substance for use in making compost.

Ordinarily, we do not advise the use of leaves exclusively in making a compost heap. Of the six inches of green matter required in the layer we advise a small amount of leaves. If all leaves were used it would tend to pack and prevent aeration. But this would not be true of ground leaves. They could be used in the entire layer. From experience and observation it is known that the smaller the piece of green-matter, the quicker it will decay. If you use whole corn-stalks in the heap, it may not decay in the three month period but if you chop them up then, they will decompose rapidly. Smaller leaved plants such as clover will decay faster than large coarse-leaved weeds, and the further reduction in size by grinding will hasten the decay. A smaller piece becomes more saturated with moisture. Air can get at it more easily. On the other hand there is a point beyond which the reduction in size would become detri-

Before grinding.

mental in the decay processes. For example, saw dust in small quantities will decompose in a compost heap, but wood flour, which represents wood ground to the fineness of flour, will cake up and prevent aeration. I tried it as a mulch on a flower bed once and it caked up as if it were cement.

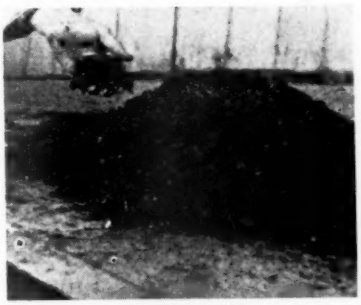
Dried weeds could similarly be ground up in such a hammer-mill. We did it with alfalfa hay and it gave a nicely pulverized material which we mixed in our chicken ration. Ground up hay would be worthwhile experimenting with in the compost heap and for mulches.

If you have a small power grinder used for grinding wheat try and see what it will do to leaves. In the cities

The hammermill does a pretty good job.

I can visualize a truck which comes around in the fall and which has one of these hammer-mills. It will pick up your leaves, grind them on the spot and return it to you neatly sacked. The manufactured material will take up only a small fraction of the space of the whole leaves. Who is the first to try out this suggestion?

J. I. Rodale



After grinding.

The Purpose of Disease

By SIR ALBERT HOWARD

IN the end Nature always takes us in hand and teaches us that it does not pay to disregard her rules. Disease is her reply to those whose actions are in flagrant contradiction to her laws, one of which is the law of return. This law holds good in crops, in live stock, and in mankind. The relation of disease to the law of return must therefore be understood.

Disease is not created by mankind. It occurs in Nature and always has and always will. It is a part of the Creation. It is met with everywhere—in the primeval forest; on the prairies; in streams, rivers, lakes, and the ocean; it is by no means unknown among wild animals. Disease has a very definite place in the natural order. This is significant. For this reason man cannot hope to eliminate it.

Disease is the means adopted by Nature for the removal of the unfit. It is also the normal accompaniment of old age when the organism is worn out. It is perhaps most easily seen at work on old trees where the diseased condition steadily advances until finally the tree ceases to live. Because the tree is so well furnished with reserve food and very effective arrangements for resisting parasites, its death is a slow process and one which can easily be watched. But smaller plants and, in particular, the microscopic forms of the vegetable kingdom are not so well provided with defences and perish much more dramatically.

The commonest agents involved in plant diseases are insects and fungi: in animals and man, various types of bacteria are the usual invaders.

The course run by disease is generally the same. A struggle for the mastery takes place between the host and the parasite. It is not a case of two organisms living together, but a battle.

Disease is the beginning of Nature's composting. The inefficient or worn-out organism is converted into material from which humus can be synthesized to feed a new generation of plants. The insects, fungi, or bacteria involved in this work may be regarded as Nature's censors whose duty it is to mark down the imperfect organism, condemn it, and then start the execution of the sentence by preparing it for transformation into lower forms of life from whose wastes and remains humus can be synthesized for re-starting the wheel of life.

Now we see why Nature has no arrangements like the burning of infected material, poison sprays, insecticides, sera, or vaccines for checking disease. Why should she fight what is her own arrangement? Why should she burn diseased material or institute quarantine arrangements? The diseased plant or animal continues in free and close contact with its fellows who are always exposed to full infection. The infection spreads only to what is already unfit. If it could spread to the fit, all life would soon cease. The parasites would overrun their victims like a forest fire. But life does nothing of the sort, it continues richly and abundantly. This is the one proof we need to tell us that disease cannot attack the healthy organism. Why, therefore, should we fear it?

Disease is no enemy: it is part of the natural cycle: it has a definite and useful function in Nature: it enters into the wheel of life. All that mankind can do by means of agencies

like the medical and veterinary professions is to help the valuable but stricken organism to become whole and to have a fresh start.

But the alleviation and cure of disease do not end the matter. We are only dealing with a portion of the subject—the casualties, most of which need never have occurred. One important question has still to be answered: How does disease arise?

We have dealt with the apparent causes—insects, fungi, and bacteria; but what is it that invites them to attack certain hosts only and leave the rest alone? If we could answer this question, we could take up preventive measures with every hope of success.

A satisfactory answer has, I consider, been found. It has been furnished by the work of Mr. J. E. R. McDonagh, one of the pioneers in medical research. This investigator considers that the nature of disease is to be found in a study of the protein complex, that constituent of the vegetable and animal kingdoms in which life resides. It will be evident that in plant diseases everything depends on the way the proteins are formed in the green leaf by methods which conform closely to those in operation in Nature. Nothing more is needed to keep diseases in check. But the moment we try to improve on Nature's methods or attempt short cuts, trouble begins. The introduction of a substitute phase (in the form of artificial fertilizers) in the nitrogen cycle is one certain method of bringing about improperly synthesized protein followed by loss of quality and finally disease.

Mr. McDonagh's detailed presentation of the normal working of the green carpet and his explanation of the irreparable damage now being done by artificial manures constitute a challenge.

This challenge has already been taken up by a few of the pioneers in the farming community. The practical results obtained on the land amply confirm the theory.

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That Old Shoe

MANY YEARS AGO I read of a man who had a grapevine which grew and flourished far more than any of his other vines while producing finer fruit. Later it was necessary to move the grapevine so he decided to investigate what might have caused its unusual strength.

It was found that the roots were all wrapped around an old shoe that had been buried years before.

Mrs. Cyril E. D. Marshall
Brookfield, Connecticut

Increase of Earthworm Activity Through Rock Mulching

By HERBERT CLARENCE WHITE

JUST one year ago I read Mr. Rodale's interesting article regarding the possible value of rock mulching in the fruit orchard. (*Organic Gardening*, June, 1945). The story of my efforts to follow this wholly new, and somewhat amazing suggestion was told in the November, 1945 Issue of this magazine under the heading of "Decorative Rock Mulches."

During the past eight months since that article appeared, some very interesting, if not startling results have been observed by this writer, especially with regard to the tremendous increase in the earthworm population and activity under the fruit trees and grape vines where the rock mulches were applied *over* the heavy leaf mulches.

Not long after the application of the first rock mulches, I noted one interesting fact in addition to the fine appearance and rapid growth of the trees and vines. My three-inch leaf mulches were disappearing as if by

(A)—Armstrong Seedless Lemon, Aug. 1, 1945 H. C. White Photo

ARMSTRONG SEEDLESS LEMON AFTER FIVE WEEKS OF ROCK MULCHING, August 1, 1945

This Armstrong Seedless Lemon was planted March 1st, 1945. It showed no growth or signs of life until after leaf-and-rock mulching in July. On Aug. 1st up to 10½ inches of new growth had developed.

(B)—Armstrong Seedless Lemon, June 1, 1946 H. C. White Photo

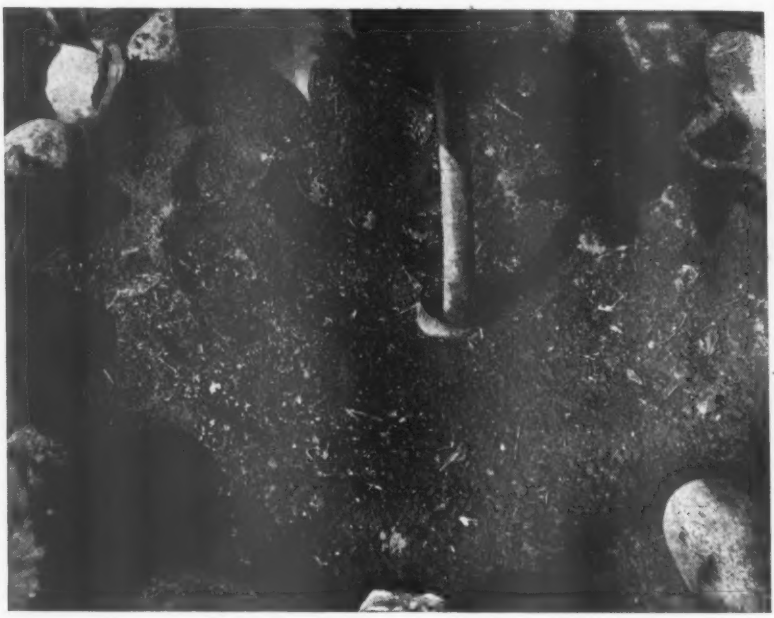
AFTER ELEVEN MONTHS OF ROCK MULCHING

The same Armstrong Seedless Lemon after eleven months of leaf-and-rock mulching procedure. Photo taken June 1, 1946. Note fine appearance of heavy foliage.

magic. Whereas in the Boysenberry patch it took from nine to ten months for the earthworm population to devour the three-inch mulch, under the rock mulches the same amount of leaves vanished completely (save for a few leaf stalks and skeletons) in only sixty days. (See illustration.) This noteworthy fact indicated that conditions created by the presence of these cobblestones, stimulated earthworm activity under the trees by at least 500%! The activity of these little creatures even at that early date in the experiment had apparently reached its peak, as subsequent applications of leaves during the past eight months have continued to disappear at approximately the same rate—Sixty days for a three-inch mulch.

Visitors to my little experimental garden have advanced some thought-provoking theories with reference to the "whys and wherefores" for this phenominal increase in earthworm activity under the rock-and-leaf mulches. Perhaps it will be of interest to our readers to list a few of these suggestions:

1. The rocks exert considerable pressure on the leaf mulch, hastening dis-



(C) H. C. White Photo

DETAILS OF LEAF-AND-ROCK MULCHING PROCEDURE
(1) The Rocks are Removed

Removal of rock mulch, June 1, 1946, reveals almost total disappearance of heavy 3-inch leaf mulch. Only a few stems, fragments, and skeletons of leaves remain on the surface. Note that the rock border (or dike) has not been removed or disturbed. Also observe the tin can that has been cut, and which encircles the "bud" or "graft" at the ground level. This keeps the earthworm castings and leaf mulch from filling in and contacting the tree trunk above the "graft". Note also that earthworm castings have been thrown up around the can, and have almost buried it.

integration and decay.

2. The leaves under the rocks retain moisture over a much longer period of time, thus creating conditions favorable to the action of the worm. This holding of moisture also aids in the action of moulds, beneficial bacteria, etc.

3. The rocks tend to create a more uniform temperature in the leaf mass both day and night; shielding it from the hot rays of the sun during the daytime, and releasing a small amount of heat during the night.

4. The earthworm loves darkness. The rock mulch creates a dark cover which stimulates his activity during the daytime as well as during the night. This lengthens our little soil friend's "work-day" and increases his output of precious castings.

The writer considers each of these suggestions as a contributing factor in this whirl-wind step-up in earthworm activity under the stone mulches. Perhaps it is a combination of all four, that produces this near-miracle which has been brought about through this revolutionary experiment in orchard practice.

The job of renewing the leaf mulch every two months may seem to many gardeners a task of formidable proportions. However, I have found it a pleasant form of recreation, and one that requires only a few minutes of

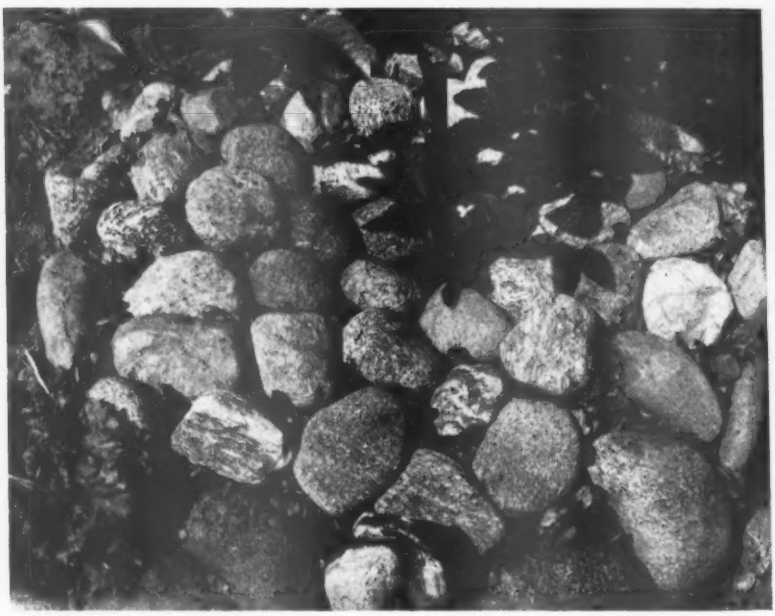
(D) H. C. White Photo

(2) A NEW LEAF MULCH IS APPLIED

Only 3 minutes are required to replace a heavy 3-inch leaf mulch after the rocks have been removed. With no elm leaves available in June, live oak leaves were substituted for the summer mulch. Note that leaf mulch does not contact the tree trunk. A tin can, the top of which is shown in illustration (C) prevents leaves from covering tree trunk above the "graft".

my time for each tree or vine. On an average it takes about five minutes to remove the rocks (leaving of course, the outer border, which forms the dike); about three minutes to apply the leaf mulch, and another seven minutes to restore the rocks to their former position on top of the leaf mulch—in all about fifteen minutes to a tree. (See illustrations). Large fruit trees would of course take longer. For the small home orchard I recommend this procedure as entirely practicable. It might even be done to advantage in some commercial orchards, where large amounts of rock are available nearby.

At this point it might be well to point out some of the other advantages of rock mulching. In this writer's opinion the extra time employed in gathering the raw materials and applying the leaf-and-rock mulches is largely, if not wholly compensated for in saving both time and effort in the after-care of the orchard. First in importance, perhaps, to the California gardener, is the saving in irrigation. The rock-and-leaf mulching procedure reduces the use of water to an all-time minimum. The problem of weeding—always a major job in any garden or orchard—is automatically solved; for no weeds will grow through the heavy leaf-and-rock mulch. The problem of fertilizing the orchard is largely solved, for the earthworms convert the min-



(E) H. C. White Photo

(3) THE ROCK MULCH IS REPLACED

It requires only about seven minutes to replace the rock mulch—15 minutes in all to complete the job, which must be repeated every 60 to 90 days. Note that the rocks do not contact the tree trunk. In this process, the surface of the topsoil is not disturbed in any way, as tiny feeder rootlets are working in the mineral-rich castings, which in this case are about 3 inches in depth.

etar-rich leaf mulches into water soluable plant food and distribute it where the feeder roots can take it up most readily. The large earthworm population also cultivate and aerate the soil without the danger of disturbing the tender feeder roots near the surface. Last, but not least, is the large degree of immunity conferred upon the trees and vines thus treated, with the consequent saving in time and materials for poisonous sprays, as well as expensive spraying equipment, which in many orchards has reached an all-time high.

During the first year of rock mulching I have given my trees and vines one application of compost humus in addition to the leaf mulches—approximately one inch thick. This, with the leaves, which through the action of the earthworm are quickly converted into neutral colloidal humus, supply the needed minerals and other essential plant food to the orchard.

Scientists tell us that up to one-third of the weight of many dry leaves consist of pure minerals, which often are brought up from great depths by feeder roots of large trees. These rare minerals when applied as leaf mulches, are converted almost overnight into

(F) H. C. White Photo

A "PIPPIN EXPERIMENT" IN ROCK MULCHING

Partial removal of rock mulch under this young Espalier Pippin apple reveals no leaves under the stones; but some litter left in the ridges *between* the stones, and in two spots where no stones were present. Note how the earthworms have thrown up their castings between the rocks. The crumbly castings, however, had a tendency to break down as the rocks were lifted. This young tree was rock-mulched in January, 1946. No earthworm castings were found here four months ago. Now look!

water soluable plant food—ready and available for plant nutrition, thanks to our friend, the earthworm.

The soil thus enriched seems to impart a keeping quality and extra flavor to the fruit, not found in fruit that has been grown on soils that have been poisoned by artificial fertilizers and lethal sprays. Sound cell structure in tree and fruit also results in a remarkable "resistence" to virus, and fungous diseases, and most remarkable of all —a large degree of freedom from insect pests of every description. Last Autumn not a single worm was found in my apples, pears, peaches, and grapes. And not one ounce of preventive measures was taken to combat these ever-present enemies of the fruit orchard.

The crowning achievements in this little experiment came last week, when I discovered up to three inches of pure, black, velvety earthworm castings under my trees that had been rock-mulched. (See illustrations C and G). Six months ago I rock-mulched my dwarf Espalier Pippen Apple. Last March when I removed the rocks to apply a second leaf mulch, I found no earthworm castings under this tree—only bare ground from which all the leaves had been taken "downstairs" into the earthworm burrows. To my utter amazement the other day when I applied the third application of leaves, I found that I had *three inches* of earthworm castings under this tree. *Three inches of castings in only four months!* Many of the rocks under this apple tree were almost buried by castings in this short period of time. (See illustration H).

(G) H. C. White Photo

THREE INCHES OF CASTINGS IN FOUR MONTHS!

This near miracle in top-soil building through the action of ordinary grey earthworms, was discovered by Mr. White under a young Espalier Pippin Apple, which was leaf-and-rock mulched last January (1946). Folks won't believe it, but this one-foot ruler cannot tell a lie. Note the stone on the extreme right which is almost buried by earthworm castings. Note also the velvety-black castings thrown up on the right of the hole.

(H) H. C. White Photo

NO ROCKS — LITTLE ACTION

This young Limequat tree was leaf-mulched in August, 1945. After 11 months the leaf mass is still intact, with very little evidence of decay or earthworm activity in the soil under this tree. In other words eleven months of leaf mulching alone reveals less earthworm activity than 60 days with stone mulches atop the leaves!

I am still a bit breathless over this latest discovery. In the June issue of this magazine I was tempted to bragg about the earthworm population in my berry patch—where these little creatures had produced up to one and one-half inches of castings in a year. Now I find up to three inches of these castings produced under the leaf-and-rock mulches in only four months—or in one-third of the time where leaf mulches alone were used. Twice the results in one-third of the time! That is a 600% gain over the results obtained in my Boysenberry patch as reported in the June issue.

As I write these lines I am getting a bit dizzy, for if the statisticians are correct, a single one-inch layer of topsoil over an acre of land will weigh approximately 428,571 pounds. According to these figures three inches of earthworm castings over an equal area will weigh 1,285,713 pounds—nearly 643 tons of it! 643 tons of topsoil—rich neutral colloidal humus, the finest plant food known to agriculture in *only four months!*

The remarkable thing about all this is that these results were obtained without "planting" one domesticated red manure worm, or a single wild grey worm in the soil. As in the berry patch, they just "moved in" on me when I provided simple living conditions and good food in the form of elm and oak leaves.

When one stops to consider all the good things a large earthworm population will do to the soil in which they live and work, he is tempted to exclaim with Alexander Graham Bell—"What hath God wrought!" For according to statistics from the Government Experiment Stations, and confirmed by leading scientists, the soil which passes through the bodies of these little animals is somehow miraculously changed in both texture and quality. Minerals "hidden" in the soil, which are unavailable for plant nutrition are suddenly released and made available. It has been demonstrated that earthworm castings contain 300% more magnesium, 500% more nitrogen, 700% more available phosphates, and 1100% more potassium than the soil from which they came. What a miracle indeed! These lowly little creatures were evidently ordained by Nature's God to perform a most important function in agriculture. They actually constitute a perpetual fertilizer factory; and once a large earthworm population is established in the soil, little else need be done to keep the land fertile and in top physical condition.

As Mr. George Sheffield Oliver reports in his famous earthworm classic, "Most soils are deficient in elements necessary for plant life not because the elements are not present, but because they are unavailable to the plant roots. . . . All the elements that are in the soil, but which are *hidden and unavailable to the plant roots, are broken down by the earthworm and made available.* Man has yet to invent, devise or manufacture any machine, any solid or liquid fertilizer as efficient as the earthworm. In this invertebrate animal, Nature has a *perpetual soil builder,* a four-in-one creature that acts upon the soil as chemist, triturator, cultivator and distributor of plant food. . . . Few creatures equal the burrowing earthworm as a necessity to better health and greater growth to plant and vegetable life, and therefore, indirectly is of the utmost importance to man."

What a pity then, that modern, so-called "improved" agricultural methods, through the free use of lethal sprays and poisonous chemical fertilizers result in the wholesale destruction and ruthless slaughter of these beneficent little helpers and friends of mankind.

It would seem that in following popular agricultural procedures the American farmer and gardener is actually "killing the goose that lays the golden egg". Henceforth our motto should be, "LET THEM LIVE"! Should not a *"Soil Building Program"* in place of an *"Insect Extermination Program"* be the order of the day in America's new agriculture?

A Plan For a Family of Four

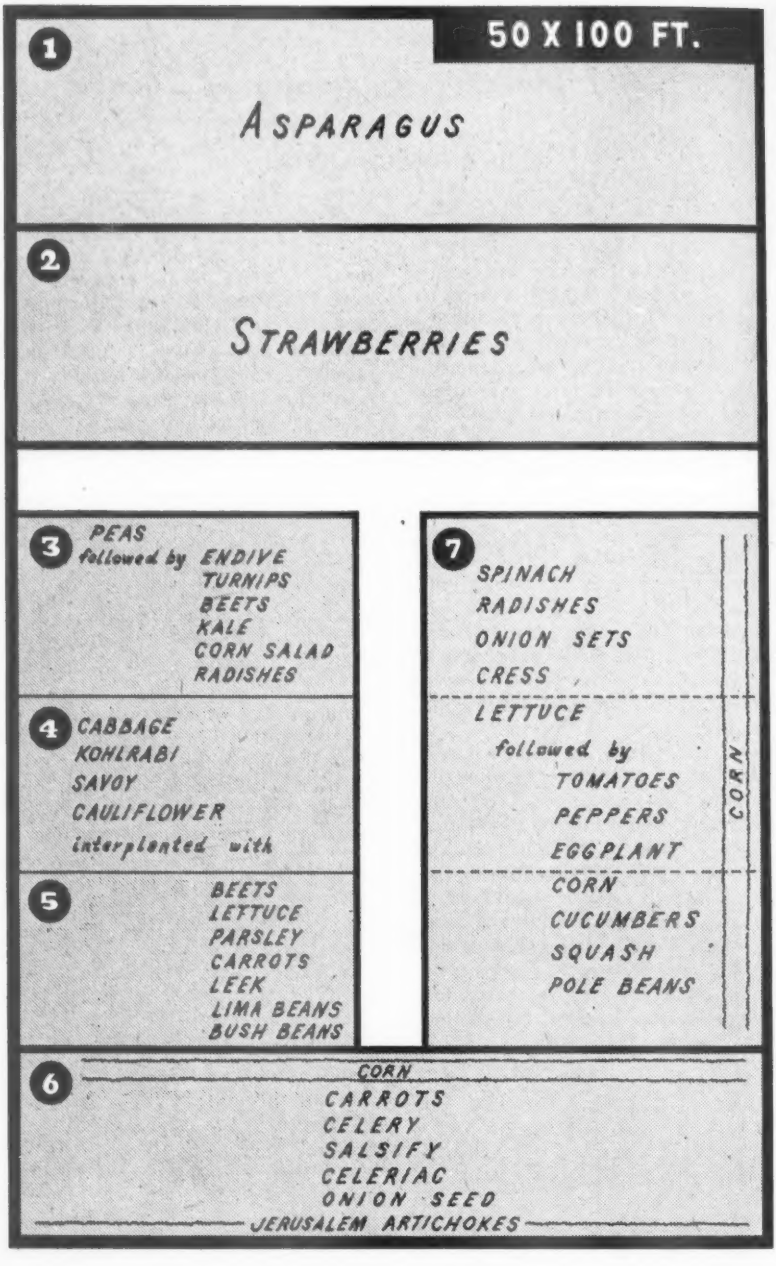
By HEINRICH MEYER

THE time for planning and digging next year's garden is now, during the fall months. How much to dig up, and how should you arrange your beds? Perhaps you have gardened for a long time and want to make minor changes about intercropping and succession plantings, perhaps you have just acquired the dream house and want to start out for the first time. If you have hand-pushed or drawn cultivator equipment or a garden tractor, you may as well use twice as much space as the gardener who cultivates by hoe and hand. I personally prefer the hand-made garden for two reasons: It is not a mere utilitarian affair handled with the greatest saving of work and time, but a place in which to potter around and to leave your personal imprint. And furthermore, it is preferred by the plants, because they can grow closer together. Nothing, absolutely nothing in my opinion, is so important for a successful garden as the need to have the ground constantly shaded. There should be no bare spots that can dry out and bake. This means close planting, full utilization of the space, and also full utilization of irrigation or watering. Our plan is therefore designed for the gardener with the small garden.

Many plans have been published for a garden of fifty by a hundred feet. We shall use the same measures so that you may compare our solutions with some suggested by others no less experienced. But all depends, in the first instance, on how much you want to produce. A vegetarian family needs about three times more ground than an omnivorous one; a family that means to grow potatoes, peas for canning and drying, and enough sunflower seeds to go around until next season needs at least twice as much as the family that buys a few bushels of potatoes and a few cans of peas and beans off and on. An eighth of an acre is enough to produce for four people all the vegetables in season and enough for canning tomatoes, beans, pickles or pumpkins, besides a good supply of carrots, rooted parsley, onions, leek, salsify, celeriac, parsnip, beets, turnips, winter radish and rutabagas to store fresh in the cellar. That is, if the ground is properly utilized by intercropping and succession plantings.

The main consideration in the original lay-out is *the growing time* of your crops. Strawberries, asparagus, Jerusalem artichoke, rhubarb, horseradish stay out for long periods of years; they require only weeding and the ground for them should therefore be well prepared at first. If you are only now starting your garden, dig up beds for these crops, but use compost next year to enrich the soil and plant sometimes later, after you have cultivated repeatedly for weeds. Especially the asparagus bed must be weed-free. The majority of bulbous and rooted crops are one-year crops that stay out through the entire season and will require little time beyond the occasional weeding with the hoe. The real garden planning comes in on the following three:

1. Early and hardy crops (leafy vegetables, cabbages, cauliflower, peas, spring radishes, onion sets, turnips,


50 X 100 FT.
1
ASPARAGUS
2
STRAWBERRIES
3
PEAS
followed by ENDIVE
TURNIPS
BEETS
KALE
CORN SALAD
RADISHES
4
CABBAGE
KOHLRABI
SAVOY
CAULIFLOWER
interplanted with
5
BEETS
LETTUCE
PARSLEY
CARROTS
LEEK
LIMA BEANS
BUSH BEANS
7
SPINACH
RADISHES
ONION SETS
CRESS
LETTUCE
followed by
TOMATOES
PEPPERS
EGGPLANT
CORN
CUCUMBERS
SQUASH
POLE BEANS
CORN
6
CORN
CARROTS
CELERY
SALSIFY
CELERIAC
ONION SEED
JERUSALEM ARTICHOKES

rutabagas). These stay out only during half of the year.

2. Warm-weather crops (Corn, beans, tomatoes, pepper, eggplants, cucumber, squash, or pumpkin, melons). These go out in May.

3. Succession Crops (Radishes, lettuce, late cabbage, second-crop spinach, kale, endive, turnip, late beets, corn salad, fall broccoli). These go out when an opening appears in the garden, either because the early crops are harvested or because there was an excess.

In order to plan wisely, the gardener should know which plants should be grown together and which should not be next to one another. This also explains why they should not follow one another. They are closely related and tax the soil for the same minerals. By planting an unrelated species between rows of related plants and by having another group following, you will not only get healthier and juicier plants but also more nutritious ones.

Separating related plants is not so necessary in spring as it is later in the year when the soil has become somewhat depleted. You can check this, of course, by making occasional topdressings of compost, but notwithstanding compost you had best be on the safe side and use sound intercropping methods. If succession crops reach over into another year, you will have crop rotation. To some extent that develops naturally in the garden, as an example will show. Assuming you start a bed with spring radishes or cress, so delicious for early spring salads, or corn salad, even more delicious; then you can easily interplant with peas, because the radishes and leafy vegetables will be eaten when the peas start spreading. When the peas are harvested, you can sow endive, turnips, rutabagas, late beets, kale, and multiplier onions that stay out all winter. You can leave a few corn salad plants standing to get seed of your own. Next year, you will probably start this field with spinach, that will naturally follow upon the kale that has also weathered the winter and given you your first spring vegetables. When next the spinach is finished, it is time for corn or tomatoes, and you can easily plant these between the rows of spinach and let them grow while you eat up the last meal of spinach with fried eggs.

Our plan is made for the medium temperate zone, about the latitude or growing season of Philadelphia; in the South, you have to consider other matters and the longer growing season which will permit you to get more from a small area than you would ever harvest in the North. At the same time, there are other crops to consider, such as collards, mustard greens, okra, eggplants, while spinach, and endive as well as cauliflower, celeriac, and pole beans are more or less out.

Before we offer our lists, we should remind the beginner that celeriac, celery, parsley are slow to germinate if sown in the open, but that they make a satisfactory crop if the soil is kept loose and moist; ordinarily celery and celeriac are raised in flats and given thereby a start of two months, but the gardener who does not have the proper light conditions for starting seedlings indoors need not forgo growing these plants. Lettuce and the cabbages are likewise started indoors; that too is not necessary in the medium temperate region unless very early crops are desired; you may sow your seeds right into the open and get a good crop if you thin out properly; the plants will be sturdier and almost make up the growth of those previously started because they need not suffer the check of transplanting. If the spring is early and warm summer weather arrives soon, trouble may, however, arise with such crops as cauliflower and kohlrabi, but not with cabbage, savoy, kale, and broccoli.

The following list does not provide for herbs, chives, and some of the minor garden plants because there al-

ways is a space for them somewhere. Now, which crops should be planted together and which should be separated?

Beets with everything except spinach and chard; six inches space.

Beans with everything, plant five or six in a hill, thin to four; place hills about twenty inches apart; pole beans at least 36 inches, no intercropping.

Carrots with beets, cabbages, turnips, leek, onion, lettuce, but not celery, celeriac, parsley, parsnip, six inches.

Cabbages (Green, Red, Savoy, broccoli, kale, cauliflower, kohlrabi) with lettuce, endive, beets, salsify, carrots, onions, leek, but not radish, turnip or each other. Early cabbages interplanted with lettuce and spinach, 12 inches; broccoli, 16 inches, interplanted with salsify, carrots, and parsley.

Radishes with everything except cabbages and turnips; spring radishes six inches, summer and winter radishes ten inches; best between spinach, lettuce, endives, corn salad.

Turnips, like radish, with everything but cabbages and radishes; seven to ten inches, best between salsify, onions, leeks, carrots, beets.

Lettuce with everything except endive and salsify; seven to ten inches, best between radishes, cabbages, beets, parsley, carrots.

Endive with everything except lettuce and salsify, eight to ten inches, best between carrots, onion sets, radish, kohlrabi, cabbage, corn salad, leek, parsley.

Vine Crops (Cucumber, squash, pumpkin, melon) ample space, plant three in a hill, three to four feet apart; can be interplanted with corn.

Onions and Leek stay out all year, like salsify, parsley, celery, celeriac and had best be given a separate bed with these; but may also be interplanted with any of the other crops; onion seeds thinned out through the year; onion sets six inches apart, leek likewise.

The fifty-by-a-hundred-feet lot may be divided in six strips; two with long-term crops, asparagus and strawberries at one end, one with full-year crops at the other end. You may have Jerusalem artichokes at the edge, then run rows of onion seed, celeriac, salsify, celery, carrots, possibly some herbs across the garden and place a row of corn at the edge. Later, this bed will be taken up by full year crops. These beds all can take a good sprinkling of phosphate rock if you have not already incorporated this in the compost heap.

The central part of the garden is divided by a walk. On the North side you will plant the summer crops, corn, beans, tomatoes, peppers, cucumbers, etc. as indicated. Before you put those out you can raise spinach, onion sets, radishes, cress, and some lettuce, also corn salad if you can obtain seed. When you grow corn and pole beans there, they will not take sun away from any of your other plants; but if your region is too sunny, you may rearrange the beds differently so that the lusciously growing summer crops throw some shade over cool-loving crops, such as kohlrabi, beets, endive. In our plan, the majority of these are planted across the three middle strips on the South side.

One part should be given to peas, which can be followed by various succession crops, such as endive, kale, radish, rutabaga, turnip, and early beets. The other two parts will be mainly the cabbages, kohlrabi, cauliflower, savoy, broccoli, between which you may plant beets, lettuce, parsley, carrots, leek, onion sets, and even lima and bush beans.

You will most likely discover that six or eight tomatoes will yield all the fruit you need, that four or five hills of cucumbers will produce more than you want, that a dozen hills of bush

beans, followed by six hills of pole beans on the other side of the aisle, will supply amply for current needs and canning and that you will not need to grow onion sets if you have a row of onion seeds across the garden in section VI. A dozen cauliflower plants and half a dozen broccoli plants, properly cut, will be enough if you have green and red cabbage, savoy and kohlrabi besides; if you plant these at about the same time you will be forced to harvest them within the same week or two weeks, and your family will probably object to cauliflower every day in season. Just the same, I found that the less delicious vegetables, especially turnips and rutabagas, may be safely omitted during spring sowing and put out only as a succession crop because tastier and pleasanter green vegetables are available when roots are to be taken out. For, while beets can stay in the ground throughout the year, turnips and rutabagas must be harvested when they are getting mature; if left out, they will rot. Carrots may be sown rather thickly and then thinned out—many delicious raw meals can be made from two or three rows of tender carrots and plenty of large roots will be left for winter storage.

So many garden plans have great beds or long rows devoted to cabbages, lima beans, tomatoes, peppers, etc. Naturally, by poor kitchen methods and much wasting, you can dispose of them; but if you take care of the garden and harvest just enough for the meals required, I doubt that anyone will need more than twenty heads of cabbage, which would mean cole slaw twenty times within a month. For one head of cabbage is ample for a family of four; yet there will be beans, radishes, carrots, onions, possibly beets, turnips, tomatoes, peppers during part or all of the same time from your well-planned garden. If needed, you can make corrections the year afterward and plant flowers or start raspberries or currants and extend the strawberry patch. And if you want to do fancy things, you can erect a trellis and grow grapes and espalier trees besides. Personally, I should get at least a Reine-claude or a Morello or both and plant them in strip III and V and an apple and a pear and space these in beds six and seven. But then, I should also have some roses and asters and larkspurs and a clump of Irises and a group of tulips and daylilies right amid my vegetables. And if you do not have to store your entire salsify crop, leave some out during the winter and dig around them when spading in fall —you will be surprised next year at iris-blooming time how gratefully the purple flowers of your salsify will greet you every morning.

Manure and Lockjaw

IT USED TO BE said that you could get infected if you worked in a soil in which manure was present. Now it turns out that the opposite is true. The lockjaw bacillus, which is probably the only dangerous microbe in the soil that could cause serious infection, is actually controlled by the application of manure. Dr. Puetzer and Dr. Grubb of the Vick Chemical Company have announced before the Society of American bacteriologists that manure contains an agent that neutralizes lockjaw. This agent is one of the many anti-biotics recently discovered and is named Clavacin.

THE FLORIST

I have grown things since boyhood and am pretty old now. Incidentally this may interest you, have been using sludge that has been pulverized. You ought to see things grow. I am a florist and all flower clippings are also used. Of course I have access to ground lime rock and phosphate rock.

I am so much so converted to this way of growing crops, just today my caretaker at the farm said he needed soda to side dress corn. I told him nothing doing.

I have in the making now, two compost piles. Just to show what compost does. I am a florist, during Easter I had some African violets that I had bought out of Memphis, Tenn. I sold all but four plants; these I took back to the farm, separated the plants and planted each plant in a three inch pot with just the pure compost sifted. These three inch pot plants barely 30 days in the compost are strong and healthy, with an abundance of shiny dark green leaves and with three and four flower stalks averaging five blooms to the stalk. The variety is the Blue Boy, the amazing part though, is the size of the individual bloom 1⅛ inches in diameter.

I am thoroughly converted to organic gardening and I'll do all I can do to help the cause.

Fred L. Horst,
Horst's Flowers
2427 Seventh Ave., So.
Birmingham, Ala.

SECRET OF GARDENING

For quite some time I intended to write to you and express my sincere thanks and best wishes for the outstanding work you are doing to help mankind. I have been an organic gardener for the last four years, and I wish you could see my garden, it alone can tell the whole story. People from miles around come to see my garden and now I am stuck. They all want to know how I do it. Please send me a packet of 100 booklets soon. The Garden Club of Oakhurst which is just in the making has requested me also, to give them the secret of such a beautiful garden as mine. Please let me know at once as I am going to make an organic gardener out of everyone interested in beautiful gardens.

Otto Schen,
R. D. 9, South Hills,
Oakhurst,
Pittsburgh 16, Pa.

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SUCCESS WITH COMPOST

I have a good garden, both for vegetables and flowers covering around 4,000 square feet, with numerous scattered beds of perennials and shrubs. When I say it is a good one, I am echoing the opinions of visitors.

Since 1935 I have used a considerable quantity of fresh cow manure and half composted oak leaves worked into the soil. In all those years I have not applied over 200 pounds of commercial fertilizers and none for the past three years. I subscribed to your magazine about two years ago and then started to make my compost as you instructed, using oak leaves, weeds, garden trash and chicken manure. The soil for miles around consists of glacial drift (gravel) and when I moved here, everyone told me that I could never expect to have even a fair garden. I believe that I have done much better than that.

Harry L. Moody,
5503 Steilacoom Blvd.,
Tacoma 9, Washington

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NUGGETS OF GOLD

I received your magazine and book on compost. My life was a happy drifting. Garbage was garbage and manure something to avoid; now they are nuggets of gold.

I've met with scorn from my 80 year old gardener whose method heretofore was to burn everything down in the fall so that our former show place has become a desolate spot. But hope rises eternal in the human breast and I hope to restore some of the former beauty.

E. McCarthy,
Hampton Bay, L. I.

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EARTHWORMS

I am well pleased with my two years experience in organic gardening. I have a new appreciation for bees, toads, birds, moles, etc. My soil is in much better condition and I note a noticeable increase in earthworms in the soil. I realize I still have lots to learn and would be glad to renew my subscription to Organic Gardening for three years.

Roger W. Hobbs,
R. F. D. 1,
Fitchburg, Mass.

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SOIL BUILDERS

Now my success in making compost according to your method: I did well last Summer, used in early Spring for the regular compost heap partly decayed vegetable and leaf mould, had the compost ready in three months and got an excellent fertile soil, having used dried cow manure, bonemeal and fish cuttings instead of fresh manure in my heap. The success was visible and I was rewarded for the labor of composting. My soil was six weeks longer alive than that of a neighbor in the same plot who had used chemical fertilizer and also was not in the habit of mulching.

E. Steffen,
1144 Neilson Ave.,
Far Rockaway, N. Y.

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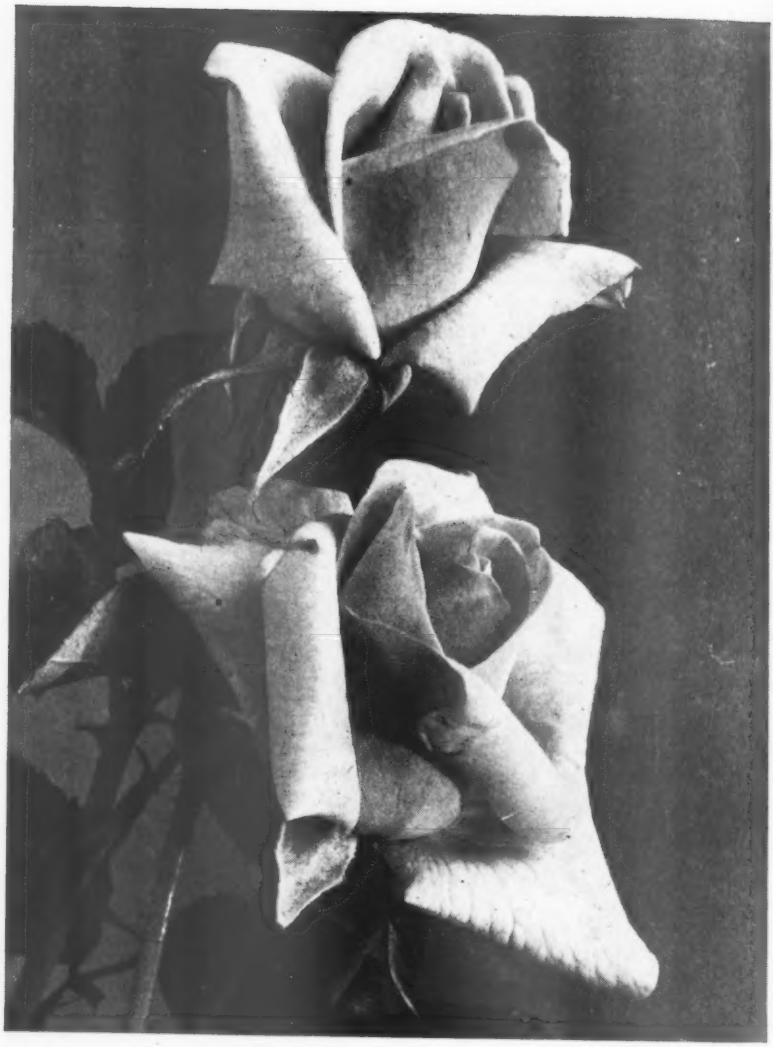
CORN JUMPS

I was born and raised on a farm and know what common compost made with chicken droppings and ashes does to corn. In a small way in my garden I have tried various kinds of fertilizers, but nothing makes corn jump like compost. I remember when I first moved here some thirty years ago, I prepared my garden to plant and had some 50 chickens whose droppings I saved all winter for compost. A neighbor came over and told me how to plant corn. I left him talk his head off and planted it as we had done on the farm. I had corn stalks 10 feet high with two ears on many of the stalks, and the neighbor then admitted that I knew how to grow corn all right.

E. S. Moore,
Somerton, Pa.



Mme. Joseph Perraud — McFarland

Big Roses and Little Roses

By J. HORACE McFARLAND

PRETTY nearly every day during the last generation when I have been at my Breeze Hill home, I have gone into the garden the first thing in the morning. Always the night has brought some change, and not infrequently a new sparkle is in the plants I look at which may not have been particularly interesting during the afternoon before, especially if the sun was hot.

Right now I am looking at the garden philosophically. It is a good garden even if the succession of late fall heavy rains and a deceptive winter did so much damage in the absence of the protecting snow that many of the garden beds show "vacancies" which cannot now be replaced, or just a stub of a plant about which I can at least be hopeful. The pruning at Breeze Hill is always as scanty as it can be, but we must cut to where we strike sound wood, for I have sorrowfully learned that while frost-injured stems may start from the rose push in them, the start will only be a false one.

So now the rose garden is quite irregular. Some of the bushes did not freeze back so much, and they are sizable; some are mere stubs, as I have before said. I know that in a few weeks with the growth that seems sure to come there will be a certain uniformity of stature in the plants, and then will come the flowers.

If I were starting a new rose garden, or if I were talking to one of the many visitors who ask for advice, I should think of the ideals to be subserved. When I look at the little Rouletti roses, which under normal and natural conditions will hardly get up to a foot in height, I have a feeling of grateful pride. I like that little rose because it is so persistent and so pleasant. I can very well start to build up a rose garden considering that I have edged a bed with the varieties of Rouletti that I think are not in the high-price class of the present garden scarcity. Long ago I have learned that Rouletti does not need high feeding. When some years ago a row of Rouletti plants were strongly fertilized, they sprang up altogether out of character and became quite undesirable. I now know that I can tuck a Rouletti on the edge of a rock and it will stay there and bloom, and as the newer varieties come along there will be the dainty Pixie, "the world's tiniest double white rose;" there is a normal pink of the taller-growing Rouletti, and some dealers have a beautiful yellow otherwise fully in

Ophelia McFarland

character with the low-growing class to which I am referring.

The next step upward would be to the Hybrid Tea class, which in itself has at least two feet of range, but which taken as the plants happen, grow, sometimes freeze and are pruned, can well stay within two feet. This is the foundation of your rose garden. You have all the colors that can be crowded into the world's best loved flower. You have fragrance, form and beauty.

Then comes the Hybrid Perpetual class, best characterized by the lovely scentless white Frau Karl Druschki. This can be almost any height you want, up to 8 or 10 feet, but the average height under reasonably careful handling is 4 to 5 feet. This forms the background of the garden and there is an air of permanence about the Hybrid Perpetuals that goes with their larger and more richly colored flowers and their substantial fragrance as characteristic of the best in roses. These do not bloom all the time—nor should they for that matter—but they do give in June the great rose festival that we admire.

There is an untermediary class, beginning with the Polyantha type now increasing in importance as the Hybrid Tea beauty is planted into it by the originators. (That shrewdest German rose grower Wilhelm Kordes has insisted that it won't be many years until the Polyantha hybrids have crowded out the Hybrid Teas, all the more so since the Floribunda name has been given to certain of the Polyantha group.)

The Bourbon and Noisette roses, including the Marechal Niel of the South and the Souvenir de la Malmaison of the Middle States, are old friends that we cannot give up, and their stature is in between.

Any modern rose garden that does not take advantage of the hardy climbing roses both to climb and not to climb, misses out. On this subject, I am perhaps somewhat of a crank, because I believe in these hardy climbers, of which I have more than a hundred kinds at Breeze Hill, usually trained on iron poles about seven feet apart and over an intervening curved iron bar or strap readily provided which will produce a fairyland effect in the blooming season and be attractive all the rest of the year. (With its perplexing disposition to mix, the dividing line between the dwarf roses first mentioned and these climbing roses is so intermingled with hybrids between the various classes that it takes a hardy man to be assured of the classification of any particular rose.) These hardy climbers, which can be trained 4 or 5 feet high, or for certain kinds carried along for 20 feet and more, give a chance to make each garden individual and not merely imitative. Certain of the rose books, (including at least one of my authorship) tell rather intimately how to use them, and I have no doubt there will be illustrations printed with this paper that will indicate the beauty opportunities easily available to one who will take this material constructively. It is these hardy climbers that give a chance to do great stunts in the open country. At Breeze Hill I had a hard situation to meet in a 580-foot curved street border with various levels. Putting in a farm fence of galvanized iron posts joined by good honest galvanized iron wires, I have made this fence a thing of great beauty as some thirty-odd roses all originated by one Massachusetts man, the late M. H. Walsh, show his stamp of originality and rose genius.

Nor is this rose hedge anything but agreeable during the winter months, because the tied-out climbing roses break the line of the fence most pleasingly, and during the considerable period of the year when there is not any bloom the leaves and the twigs give an appearance far better than any artificial fence could provide.

There is another class of roses which needs to be taken into the picture because there is in it so much of beauty and adaptability. The old-fashioned Cabbage roses, the Damask roses, the Austrian Briers, and many that are

Heart's Desire

McFarland

grouped as rose species come into great usefulness. The common wild rose of the East belongs here; so does the lovely Primula, originally from Turkestan, which makes a great 6-foot bush with blooms the first of any rose each season in its primrose loveliness. The white Wichuraiana, the pink Max Graf, and a half hundred others which could be slowly accumulated by one who really loves roses, would provide splendid bushes that would be sufficiently defensive and at the same time would be wonderfully beautiful. Ordinarily they will give two seasons of beauty, once when blooming and again when their great fruiting occurs and various rose heps carry on, sometimes over winter.

This survey has not been intended to be complete, but rather suggestive. If I can start any reader to investigating for himself, I have made a firm friend of the rose out of that person. I think, for example, as I write of a most interesting rose that I was called on some years ago to get acquainted with because it was hardy at forty degrees below zero and paid no attention to weather. The shoots ran under the ground, and when they grew above ground they made scenes of great beauty. One plant came to me and was bloomed as a beautiful fragrant single rose. I have to treat this particular rose as Rosa suffulta, and I think it has great possibilities for the future.

Nor have I mentioned the subtropical roses that are forms of R. odorata and have a pleasant habit of wandering for 40 or 50 feet in the forest, producing incidentally great single flowers. These and our own American natives and derivatives, included among the Carolina roses, the Chinensis roses and the Moss roses are another story which can come to the one who takes fire at the simpler thing and goes after knowledge that will well serve him. All that I have written too is well away from the high-price flowers brought about by war scarcity. I think I have lifted the curtain on the world's best loved flower, not yet all "patented." The American Rose Society maintains in its offices a loan library available to its members so that he may borrow many books, some of them very precious, that will tell him how to live with the queen flowers. If he does that he will be a better man and his family will come to know that he is fringing his life with Heaven's best gift.

Roses and Organics

"ORGANIC MATTER of various kinds has been used and recommended. Heavy applications of manure or other organic matter will very often prevent the chlorotic condition even though the soil remains alkaline," says I. C. Ratsek of the Texas Experiment Station in *Soil Acidity and Roses*. When roses get yellow leaves and thin stalks with poor blooms, the soil may be too alkaline and can be repaired by compost; for "The greater the percentage of active organic matter in the soil, the wider the range of pH (acidity or alkalinity) under which roses can grow without showing symptoms of chlorosis."

Garden Calendar --- September

NORTH TEMPERATE ZONE: In the *vegetable garden,* onions can be set out, especially the multiplier onions that are hardy and produce bulbs instead of seeds next spring. Rootcrops can be left in the ground until serious freezes start, parsnips must be exposed to a slight frost to become best. Asparagus may be mulched. Sow field salad or corn salad if obtainable. Most seed stores have run out of seed, because the crops failed. In the coldframe, you may sow parsley, lettuce, spinach, chives.

Herbs are divided, chives transplanted, garlic set out for spring use.

The compost gardener has now ample *waste materials.* If you cannot get around to compost making for later use, make at least a pile of plant matter. Where weeds are used, this is sometimes practical, because the weed seeds will be dropped now and next years compost heap can be built on top of them. But well-made compost will still mature before the end of November if started immediately.

Lawns can now be made most successfully.

Since there usually is *more time* in fall than later when the frosts require attention to mulching, it may be wise to put up a goodly amount of soil, to screen it, and to set it aside for potting mixtures during winter and for spring flats.

The flower gardener can sow *hardy annuals* and biennials if the ground is adequately mulched. But as a rule spring sowing is preferable unless you can sow in a coldframe to give winter protection.

From now on, *bulbs* should be planted. The fragrant hyacinths are again available in good quantities. Try also the various white daffodils which are almost always scented. Species tulips will surprise you by their delicacy and ease of cultivation. Lilies will do best in rich humus soil, even surrounded by grass. Daylilies can be naturalized on banks and slopes, while irises take a bit more care.

Budding can still be done in the orchard and dried-up eyes can be replaced. Scrape the dead bark from fruit trees and whitewash with a hydrated lime paste to protect against sun scald.

Perennials can be divided, offsets and bulblets started in a protected spot or coldframe. Trees and shrubs can be transplanted when they become dormant, which may be late in the month or during October and November. Evergreens should be transplanted in spring, because they get too much of a shock when moved now, since the disturbance of their root system may make water supply difficult for them; yet they keep on transpiring through the winter as they keep their leaves or needles.

SOUTHERN GARDENS: The season starts all over in the Gulf Coast States where vegetables and flowers are raised from January till May. Here hardy annuals are sown, and cool weather plants started. Mignonette, carnations, lettuce and spinach are cool weather plants; but beets, cabbage, broccoli, carcots, radishes, etc. can now be sown. Try rooted parsley for a change. Herbs can be sown, but most of the umbrella-flowered ones, anise, coriander, dill, fennel, should not be transplanted. Most of these can also be sown in spring. In the old South many Northern crops can grow and many Northern plants will flower if advantage is taken of the cooler months. The cool-weather plants can usually stand a few degrees of frost. While strawberries may be started in fall everywhere, they should be then started in the South. Select sturdy runners and prepare the beds well with compost humus. In the warmer regions composting can go on unchecked, but provision may be made against the torrential seasonal rains that will leach out the nitrogen. Sheds are best, but boards or straw are a help.

Lawns

A Questionnaire Directed to Paul Pfund

SOMETIME, this spring we looked at grasses and their good or bad manners to find a formula for the perfect lawn. At the end of that article we promised an article by a practical lawn expert, our Chicago contributor, Paul Pfund. But the practice of the nursery business was so extended that Mr. Pfund had no time left for theory. We have therefore put together thirty questions, frequently asked by readers, and Mr. Pfund has made short notes on them. The comments made and answers given are intended to apply in all areas where blue grass (Kentucky or Canadian) thrives, and pertains more specifically to these two varieties.

1. Can lawns be sown on subsoil?

   Yes and no. Depending upon the nature of the subsoil and length of time of direct exposure to the elements.

2. Should it be sown in a prepared seed bed?

   Yes, if one wishes to establish a permanent turf. Here as in all other phases of soil culture, time and timing is of essence, which give the elements an opportunity to have their effect.

3. Should the seed bed be finely pulverized?

   Not too finely especially on sloping terrain. If left rather lumpy much washing away of soil and seed can be prevented. This will not interfere with a good turf.

4. After seeding, should the bed be rolled flat?

   Rolling after seeding has in reality only one main purpose. That is to firm the immediate surface, thereby firming soil and seed together to help prevent seed from blowing and washing away. This should never be done on heavy soils while the ground is wet enough to become packed, because baking and cracking will inevitably take place.

5. After seeding, should the bed be well watered?

   I do not recommend watering immediately after seeding. Wait for the first penetrating rain and then follow up by keeping the surface constantly moist until grass is about an inch tall. This is of extreme importance in spring sowing especially.

   Most lawn failures occur during this stage of germination and growth because of inattention to constant moisture needs. This is true of all other seeds. The finer the seed the closer the attention that is needed. The best lawns usually come from the finer grass seeds. A strong thick practically weed free turf may be obtained by following three cardinal factors, namely:

   1st. A well prepared seeding surface.
   2nd. Sowing only the best of grass seed, (not too thickly).
   3rd. Keeping the seed bed thoroughly watered until the grass is well established.

6. Should compost be put into the seed bed before sowing?

   Nothing I have tried and found equals, in permanent results, the use of well composted soil applied before seeding. It is amazing what

a depth of only a few inches of properly composted soil will produce if placed on a good clay subsoil.

7. For renovating a lawn, shall I sprinkle lime on it?

Renovating a lawn may mean any one of several procedures. Sprinkling lime does not usually mean a great deal constructively. It may do actual harm.

8. For renovating a lawn, shall I sprinkle seeds on it?

Simply sprinkling of seeds may not accomplish much. It could be an actual waste of seed, time and money.

9. For renovating a lawn, shall I prepare the soil in thin spots as I would for starting a lawn?

If by renovating is meant to simply establish a turf in bare spots, then preparation of the soil must usually be carried on as for an entire new surface. However, where very many bare spots appear it is usually an indication of a soil deficiency. For such conditions there is only one sure remedy. Renovate the entire area.

10. Lawns are part of landscaping; it is necessary to consider walks, foundation plantings, etc. when starting. Am I right?

Lawns, indeed, are an integral part of landscaping. The finer the lawn the more effectual other plantings, other factors being equal. Grade levels are of great importance and should be carefully worked out.

11. Are lawn mixtures usually better than a single variety of grass?

There are advantages in both. I have never seen finer turfs, and as enduring, as those grown of pure Kentucky Blue Grass. There are good reasons for mixtures especially in some soils and climes.

12. Are clovers objectionable in lawns?

Clovers can be objectionable but not necessarily so. Clovers are usually green in long dry spells while other grasses may look brown.

13. Do close-cropped lawns last longer than longer turf?

Rather those which are not closely cropped will last longer. Too close cutting unduly exposes the base of the plant to the action of the sun and winds and especially in the more arid regions would permit undue burning. Nature never crops closely.

14. "Lawns cannot be made without commercial fertilizers." Is this true?

On the contrary. The best lawns are those on which no synthetic chemical commercial fertilizer is used. Since synthetic chemicals are foreign to and incompatable with soil bacteria it necessarily follows that with lawn grasses as with all other growth the organic method of soil culture is nature's own way and should at all cost be scrupulously followed.

15. Is drainage necessary for a lawn?

Drainage, natural or artificial is just as important for lawns as it is for all other non-aquatic growth. It may be provided by sloping grades, porous gravel subsoil or field tiles, the latter placed at proper depths.

16. Can heavy loams be improved by the addition of sand, peat moss, compost or humus?

All of the subjects stated are very beneficial. A mixture of all four is fine. For a combination of any two, compost and torpedo sand (or any similar sand) would be first choice. The incorporation of such additions to heavy loams should by all means be made at

the outset in constructing a lawn. Later additions will also be highly beneficial and should be made from time to tome. Dandelions dislike sandy loam.

17. To distribute seed evenly do I mark the area in strips before I start sowing?

The sowing of seed is an art if one would accomplish the ideal. Marking the area in strips is one way of seeding. This is easily accomplished by using a broom or rake handle to mark the soil. There are good seeding machines on the market which serve the purpose very nicely.

18. The best time for starting a lawn is fall. Do you agree?

I believe this to be profoundly true in all blue grass areas. Almost invariably all of the danger of loss of growth during the germinating period is eliminated and that without the need of artificial watering. There is an early fall and a late fall seeding time. The absolute dead-line for early fall seeding is the week of September 20th. For this, all seeding areas must have been prepared, or preparation at least have been commenced not later than August 1st, July 1st is better. Such action gives time to till and re-till the soil enough to kill out most if not all noxious weeds, and carry on any other necessary cultural processes, such as thoroughly incorporating compost, sand etc. The late fall seeding is done any time after all possibility of seed germination is past for the season which is usually from November 15th to December 15th. In other words seeding may be done anytime while the ground is open enough to rake in the seed. It should be observed however, that late sowing of grass seed on sloping areas is subject to the risk of washing away during the winter. It is therefore doubly important that the surface be left fairly rough.

19. Southern lawns, made of Bermuda or Saint Augustine grass are best planted, not sown.

Yes, either in sod form or stolons.

20. Flawn is a slow-growing lawn of great regularity, suitable to the South. How about the Midwest?

The practical value of Flawn has not come to my attention in this area.

21. Grading is necessary for a proper lawn; can the grade be more than twenty degrees?

As to any given degree of grade it is hardly practicable to make a set rule. The requirements are so many and varied that grades should lend themselves to the most practical and artistic effects. It is however the part of wisdom to avoid if possible any steep terrace slopes facing south or west.

22. An expensive, choice lawn seed is not necessary, I am told. What do you think?

The best is none too good, meaning that the finer quality of seed used the better the final results. Cheap seed usually lacks the necessary attention in cleaning to render it weed-free. Also the germinating quality is correspondingly high or low. Everything is to be gained by sowing the very best seed obtainable regardless of price.

23. A good mixture weighs twenty pounds per bushel or more. Am I right in this?

The best Kentucky Blue Grass weighs 28 lbs. per bu. A sufficient quantity to sow is 1 lb. to 200 sq. feet.

24. Seed beds should be started in time to destroy weed seeds. How about this?

No operation in the making of a lawn is more important than the timely preparation of the seed bed. As stated before, time and timing is of essence. There is a saying that one half the possible success of a farm crop is secured before the seed is sown. Namely by thorough soil preparation. This is constantly proving to be true.

25. Spring-seeded lawns must compete with more weeds than fall-seeded lawns. Yes or no?

Emphatically yes. This is but one of the hazards of spring seeding.

26. An established lawn survives without watering, or does it not?

This depends upon what kind of grass is established. It is certain that with some exceptions, Kentucky Blue Grass survives almost any extended drouth period without watering providing it is deeply rooted.

27. "A newly started lawn must be cut when the grass is about three inches tall." Correct me.

The first cutting may well be made when three inches tall. Set the mower to cut no shorter than two inches. In the best practices grass clippings are never removed. Cutting is done regularly enough so that there will be no lodging of mown grass to smother the lawn. An iron rake should rarely if ever be used on any lawn. Blunt tined wooden rakes are kind to grass plants.

28. When must an established lawn be top dressed?

Top-dressing preferably of well seasoned compost properly shredded is the most ideal substance and can be applied anytime summer or winter. The most direct benefits are unquestionably derived either in spring or fall or at any other rainy season.

29. There are different lawn mixtures for dry soils on the market. What is best in your region?

No mixtures of outstanding merit have come to my attention which excel Kentucky Blue Grass.

30. Grasses of one region will not grow well in all other regions, am I right?

This is very true. As has been noted at the outset, the foregoing is written primarily for regions where Blue Grass thrives. As to principles of soil culture, they apply quite generally everywhere.

31. Lawns under shades of trees must be . . . .

It is usually difficult to establish a new lawn of permanent character under large trees. Density of shade, heavy dripping from large branches, and the lack of total moisture volume due to surface feeding of some trees, are the chief reasons for failure. Italian Rye Grass, an annual variety, usually provides an excellent substitute but obviously must be seeded each year. Where perennial grass and trees grow up together, (that is when trees are planted rather young) a very satisfactory permanent turf usually results. This latter might be termed real compatibility.

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A NOTE ON GRASS MIXTURES

As Mr. Pfund pointed out, grasses vary in their value for different regions. The following is a list of lawn grasses and their characters.

RHODE ISLAND BENT or COLONIAL BENT GRASS, different varieties of these, sold as TRIPLE A BENT, ASTORIA BENT, FIORIN. All of these are called *Agrostis tenuis* and have very fine seed, over four millions to the pound. The grass is small, but the sod is deep and silky, of light green color from early spring till autumn. VELVET BENT

(*Agrostis canina*) is still finer and silkier. CREEPING BENT, also sold as SEASIDE BENT (*Agrostis palustris*) is a vigorous grower that sends out many runners, and *Agrostis alba,* the common REDTOP, used also in pastures, is frequently grown as a nurse grass in lawns, that means, for purposes of getting other grasses in the mixtures established.

The next group is RYEGRASS, not to be confused with the grain rye. One of the ryegrasses, the ITALIAN RYEGRASS, is coarse and makes much hay. If grown in a soil rich in nitrogen, it makes a very nutritious crop. If a speedy lawn is desired, PERENNIAL RYEGRASS (*Lolium perenne*) is often used. In England, this was one of the most common turf grasses, and many special strains, particularly the Svalof strain from the Swedish plant experiment station Svalof, are on the market. Domestic ryegrass is sometimes sold as WINTER GRASS and put on a Bermuda lawn in the South to make a green winter turf.

The FESCUES (*Festuca*) form another group of meadow and lawn grasses; they vary in weight according to the variety, the seeds are about five times as heavy as the Bentgrass seeds, but lighter than Ryegrass, which has about 300,000 to the pound. CHEWING'S FESCUE (*Festuca rubra*) is a grass firm in texture, but fine in form. It makes a nice matted lawn especially where much wear is required and is highly resistant to drouth and heat. A special strain (53-27) is resistant to chinchbugs and of deep rooting qualities. For fine turf, CREEPING RED FESCUE is used, while TALL FESCUE or ALTA FESCUE (*Festuca elatior*) and MEADOW FESCUE (*Festuca pratensis*) are broadleaf species, suitable for meadows.

The *Poa* grasses, about two million seeds to the pound, are the most commonly ones used under the name of KENTUCKY BLUE GRASS (*Poa pratensis*) and CANADA BLUEGRASS (*Poa compressa*). One species, *Poa trivialis,* sold as BIRDGRASS, SHADE BLUEGRASS, etc. grows in the shade, while ANNUAL BLUEGRASS is a suitable admixture since it thrives early and late; it will die out, but has meantime reseeded itself, however closely you may have mowed.

BROMGRASS (*Bromus inermis*) is a pasture grass that will thrive on dry soils. It is widely used in the Western States where the summers are dry and could be used for holding slopes, because it has deep roots. The CRESTED WHEATGRASS (*Agropyron cristatum*) comes from Siberia and grows well in cold weather, but is coarse; so is ORCHARD GRASS (*Dactylis glomerata*) which when cut young is not at all despicable for feeding purposes, but becomes strawy. It does not mat well at all. Grasses like it, which tend to form bunches, for instance, the JOHNSON GRASS, may become weeds in finer lawns.

TIMOTHY is commonly known and special strains of it are available. Its Latin name is (*Phleum pratense*) and it grows well in the Northeast, while lawn grasses for the South are BERMUDA GRASS (*Panicum dactylon*) and FLAWN (*Zoysia matrella*), besides the vigorous ST. AUGUSTINE GRASS (*Stenotaphrum secundatum*). In moist parts, the coarse CARPET GRASS (*Axonopus compressus*) does well, but it too is a grass for the South, as is CENTIPEDE GRASS (*Eremochloa ophiuroides*). *In the North, the* REED CANARY GRASS (*Phalaris arundinacea*) does well in wet locations.

If your soil contains lime, you may wish to add WHITE CLOVER, of which the small variety WILD WHITE CLOVER is a bit costlier. Some people do not like it, especially because it stains the clothes more than the grasses.

It is unwise for the average home owner to experiment with lawns, he should rely on the best seedsman he knows and buy the best seeds or seed mixtures he finds there. Some companies make lawn seeds their specialty and advise on quantities according to their mixtures. One firm, who put out Staigreen Lawn Seed, recommends five pounds for 1000 square feet or 200 pounds to the acre. This firm like all

other experienced dealers have special mixtures, for instance one called Terrace Sod Grass, one for Turf in the City, one for Turf by the Sea, one for Turf in the South, because Southward from Virginia our Northern grasses will fail and Bermuda Grass, Carpet Grass, St. Augustine, and Flawn must be used. Mixtures are often desired for one particular purpose: You want a quick pleasant cover on your property, but you also want a permanent sod. Thus a quick-growing grass is mixed with a permanent grass which will take over in the end, overpowering the quick grower. For Golf courses, football fields, bowling greens, and lawn tennis or badminton courts and finally polo and race tracks different requirements lead to different mixtures. The reader is not advised to make his own, but to get his mixtures or pure seeds from his dealer. To give an indication of values, I quote the price for Kentucky Bluegrass from one of the reliable houses. Ten pounds of recleaned selected seed is offered for $11.50 and of the less specialized grade for $9.50, while ten pounds of Triple A Bentgrass is quoted at $20.00. The Ryegrasses are coarser and therefore less expensive, while white clover sells for $2.00 to $3.00.

Meyer

Azaleamum Princess — R. M. Kellogg

Hints for the Home Fruit Grower

By ROGER W. SMITH

The Vinifera Grape

ALMOST all early explorers, in commenting upon the abundant fertility of our land, gave colorful accounts of "wild grapes growing in the greatest profusion". Grapes have been used to indicate a land's fecundity since time immemorial.

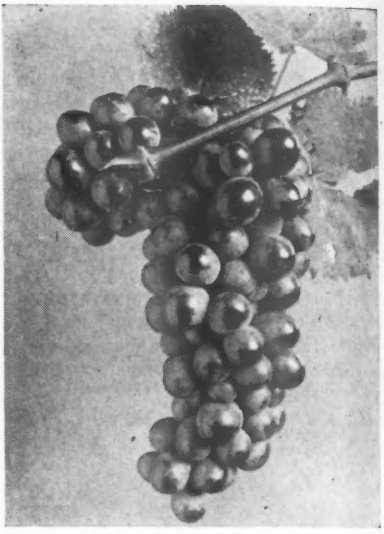
But early colonists soon were disillusioned. True, there were wild grapes of many kinds bearing fruit both large and small. The wild fruit wasn't what they had expected. They liked it and used it in limited amounts but it wasn't their fruit.

The early colonists were home-sick for the grapes of their home land. They appreciated the wild grape and used it, they probably suspected it of having health value, they never had the least idea how important the wild grape really would be in the near future. The colonists longed for the grapes of the Old World.

Practical dieticians give to the grape certain food values. They admit that they don't quite understand why the grape should give such valuable results when added to the diet of a convalescent. Its chemical content is announced quite regardless of variety. Generally the grapes used are believed to have been *vinifera.*

Many people, like the early colonists, prefer the fruits of the *V. vinifera.* You too may wish to grow California-type grapes in your own back yard. This is not an impossible proposition. Vinifera grapes have been grown sucessfully outdoors even in New York State, and fruited well.

Before you start you might find it well to consider first the natural habits of the *vinifera.* It seems likely



Downing McFarland

that the wild ancestor of the cultivated grape of Europe is lost in the obscurity of time. You will find it best to select the very earliest grapes, since this plant is apparently accustomed to much sunlight.

Also, before you start, you might like to know what happened to the colonists and why they failed. They not only imported rooted vines, they imported skilled vineyardists from France to take care of their plantations. For a few years the vines thrived then they were swiftly cut down by a strange disease.

Much later it was found that the plants were destroyed by attacks of the vine root louse (*Phylloxera vitifoliae*), an insect which, during its life cycle, forms galls on the leaves of the plant but lives mainly upon its roots.

The tiny grape louse which wrecked practically all vineyards is native to all regions east of the Rocky Mountains, yet this vast area teems with grapes of infinite variety. Most of these wild grapes, especially those of the lower Mississippi valley, have developed such resistance to damage as to be practically immune.

The same might be said of the fungus disease of the grape. Wild grapes, wherever you find them, seem to be thriving under adverse conditions. You find them bearing fruit over shaded, swampy brooks with their roots deep in damp soil and in damp and sultry woodlands where it would seem impossible for them to survive, or at least for their fruit to survive, the attack of numerous molds and rot organisms which love slow-moving, humid air.

You know how important it is not to overcrowd grape vines, the necessity for free air circulation, sunlight, etc. to prevent or reduce the damage done by "black rot" and other fungus troubles. You observe the wild grape of your vicinity and then the cared-for garden grape vine. Why should the wild one seem always to flourish and the garden variety seem almost always to fail?

You compare briefly the conditions under which each lived. Perhaps the outstanding difference between them was the fact that the garden vine was well nourished and the wild vine apparently half-starved. But briefly, this may be the answer. A little compost and a little care, a little mulching with the leaves that are so much of a problem in the fall, may be worth more than we suspect.

You sum up your problems before you plant your vines, (1) Their fruit must be formed early, (2) The plants must be quick growing and resistant to disease (3) The plants must be grown upon native American wild grape root so as to avoid destruction from the grape-louse. You don't worry too much about supplying plant food. If your soil has good drainage it should be easily possible to provide the vines with enough, but not too much, natural plant nutrients, through the application of moderate amounts of mature compost humus.

When you attempt to grow Vinifera grapes you won't fail for the same reason that the colonists did. You will buy *vinifera* vines grafted on native rootstocks. But the colonists didn't fail altogether. They planted many vineyards which eventually failed because they didn't properly understand the great difficulties which faced them, and had no idea of their solution. You know what they are and will learn how to cope with them.

Many years after the vineyards of the colonists had failed, a farmer by the name of Bull who farmed a place near Concord, Mass., discovered a seedling plant. It bore fine fruit. The plant was apparently a wild fox grape, but its large bunches of fruit showed clearly its close relationship with the *vinifera*. The berries did not drop.

Given proper or even reasonable soil conditions, your most urgent need is sunlight. To some extent you can meet this need by selecting only those kinds of *vinifera* which form their fruit very early, the short-seasoned or early ripening varieties.

That spot in your garden which receives the most sunshine, that spot where the sun just blazes down so that most plants wither, is not too hot for your *vinifera*. Reflected heat from sun-heated walls or from temporary fences, white-painted, sometimes help.

California nurserymen and others offer many fine types of *vinifera* growing on native root stocks, Golden Muscat especially. This or, Pedro Ximenes is a white grape; Malaga or Chasselas de Fontainbleau are red. For a black grape you will likely choose that old reliable table grape, the Black Hamburg. But California nurserymen are often short of plants and then do not export outside of the

Grafting grapes

state. Sultaninas (Thompson Seedless) are very vigorous growers and may succeed under North Eastern conditions. In any case your selection will be limited by the ability of your nurseryman to supply what you order. You may order certain kinds of vines on certain kinds of rootstocks; he may tell you some of them are not available and suggest substitutes. If you are dealing with a well established concern, you may find it wise to accept what you can get.

You receive the rooted vines during March or early April. They should be set out as soon as weather conditions permit. The union—the swollen part of the stem which indicates the place where the two plants were joined by grafting—should be slightly above the level of the garden.

Then the whole plant should be buried beneath a heap of soil, not even the tips of the stems—which should be shortened a little—should be exposed. If you fail to completely cover the young plant it is likely that the young plant will fail to strike roots and grow.

All during the long summer your *vinifera* grow, some rapidly, some more slowly according to their nature. At first you had to depend upon the labels you had tied upon them to identify them. Quite soon you learn to tell them apart; the dark-ribbed leaves of the Black Hamburg, the pale and delicate green of the Thompson Seedless, the thick and fuzzy leaf of the wild grape.

As the plant grows, all side shoots on the main stem should be removed except those near the garden surface, the plant should be encouraged to become as bushy as possible. During the winter the vine must be laid down and covered to protect it against fluctuating extremes of heat and cold and to prevent heaving.

With an eye to such matters, you will train the main stem to slope diagonally in the direction of the place upon which the canes (young branches) are to be laid down and covered during the winter months.

The beauty of the Wine Leaf, Golden Muscat Grape

You don't expect to gather fruit the first year, or the second, for that matter. But after the summer has passed and you prepare to protect your plants against the rigors of winter, you will find it best to rake away the heap of sand around the young *vinifera* and closely examine it. All adventitious roots emerging from the stem *above* the union should be cut off.

In the late Fall the whole of the vine should be "laid down", that is, it should be placed upon the ground and held there by pegs if necessary, and covered with a foot deep layer of salt hay, straw, or similar material. This material should be held down by sticks or tree branches. It should be removed by degrees in early spring.

Your attempts with the *vinifera* might well cause you to wonder just what kind of a crop you might expect if you succeed. Properly grown, the Black Hamburg has produced bunches of fruit each weighing more than fifteen pounds and many, in fact most, of the *viniferas* form very heavy bunches of fruit.

by H. K. MEYER

Over the Fence

ONE RAINY SUNDAY, I reread Smollett's *Expedition of Humphrey Clinker,* one of the most amusing books of the 18th century. I had a vague recollection of agricultural practices described in that racy novel and did, indeed, find my memory correct. There was a description of stone mulches, a thoughtful analysis of bleached and adulterated bread, and a discussion of Aberdeen-Angus cattle, in those days called Black Cattle. Smollet was a trained physician and can put a good deal of sarcasm in the description: "The bread I eat in London is a deleterious paste . . . the people prefer it to wholesome bread because it is whiter than the meal of corn. Thus they sacrifice their taste and their health and the lives of their tender infants to a most absurd gratification of a misjudging eye; and the miller or the baker is obliged to poison them and their families in order to live by his profession." Not much progress since! We still take some twenty per cent out of the whole grain and give the depleted flour to people, the minerals and vitamins to animals. As regards Highland cattle which run wild all winter we find that they are guided by their instincts to the seaside "where they feed on *alga marina* (seaweeds) and other plants that grow on the beach."

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ON TRANSPLANTING. When a group of plants becomes sick, it is time to transplant them. In nature they would have spread of their own account, in the garden they were kept within their apportioned bounds and have therefore exhausted the soil in some substance or another. I made a little experiment with an old bank of chrysanthemums, which looked sickly this spring. Instead of combatting the pest with dust or spray or feeding the group with compost, I divided the thick clump. In a new spot, the sick-looking plants recovered without any further attention; while the remaining group looks still unhealthy. I shall take them out altogether, dress the place with compost and put another group of plants there next spring. This method corresponds to crop rotation in agriculture. Many readers who ask what to do when their roses show spots or when their canes have mildew do not really need any specific advice at all. By transplanting, they will in ninety cases out of a hundred solve their problem the natural way. For crop rotation is natural and applies to flowers, vegetables and small fruit as much as to grains.

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WITH THE FOOD SHORTAGE endangering millions of people all over the world, I wonder why not more people have insisted on saving flour by eating whole-grain bread. The millers certainly did not suggest this approach, though one reader to the Editor of the *New York Times* did. My wife experimented a little and baked bread with four cups of oat meal to one cup of white flour; it was delicious, very nourishing, and quite practical. All that is needed is to let it rise for a bit longer than ordinary bread and to bake it in a somewhat slower oven to get it baked through. Oats as a rule are richer in calcium than wheat, often also in magnesium, but especially in some of the trace minerals, such as cobalt, copper, and

in other vital elements, such as iodine. Many peoples of old used oatmeal exclusively for a cereal and never had trouble with deficiency diseases.

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IN WORKING NOW on my projected booklet, *Organic Fertilizers,* I discover an almost unending row of compost supplies. There are so many waste products which, in large parts of the country, are left to rot or are even burnt up that it is difficult to see why composting should be impossible on a national scale. Near the cities, there are the abundant city wastes; and in the country, there are animal wastes and residues from many operations, such as cider mills, cotten gins, stockyards, etc. Quite often, manure can be had for the hauling and I know a man in a city of 500,000 who borrowed a trailer and cleaned out a riding academy for the benefit of his garden. Look around and use your imagination!

—o—

THE OTHER DAY, as I was going along my property line with the scythe to prevent the gradual intrusion of the hedge into the fields, I realized with a sudden impact how fragile our whole civilization was. Suppose there *were* an atomic war. It would disrupt distribution even more than production. What would happen to the food situation if our farms were suddenly without fuel for tractors and oil for machines? The small subsistence farm with diversified enterprises would be the only one that could operate, but it could not feed the people at large. Figure it out whichever way you want, permanent security exists only if a large part of the people can raise their own necessities. They would and could do so without chemicals. Let us hope that this will be done without a great human disaster as the cause.

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WHEN YOU READ of Clarkia, Fuchsia, Thunbergia, Camellia, Wisteria, do you think of the man after whom they are named? For these and many other plants honor the name of a botanist or patron of botany. The Clarkia for instance is named after Capt. Clark of the Lewis and Clark expedition. A French botanist, Plumier (1646-1704), was the first to name plants after people. He was, incidentally, one of the first to study American flowers scientifically, and most of his classifications are in existence this very day. If you are interested in plant relationships and names, there is no better book for it than the *Manual of Cultivated Plants* by the great Liberty Hyde Bailey, published by The Macmillan Company of New York. It is a handbook that will suggest many thoughts to an observing gardener.

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FRANK DOBIE, whom all friends of the West have read, was during the war years lecturing at Cambridge, England. Dobie is a fine and genuine writer, the good kind who have something to say and know how to say it, but some folks shook their wise heads and though Dobie might give or leave a wrong impression of American academic life. I am sure he made more friends than anyone else could have, and if you want to read what he says about Farmers and Earthworms in England, look into his *A Texan in England,* published last year by Little, Brown and Co.

Kaufmanniana Tulip

McFarland

Naturalized Narcissus

McFarland

Fall Planting of Tulips and Other Bulbs

By HEINRICH MEYER

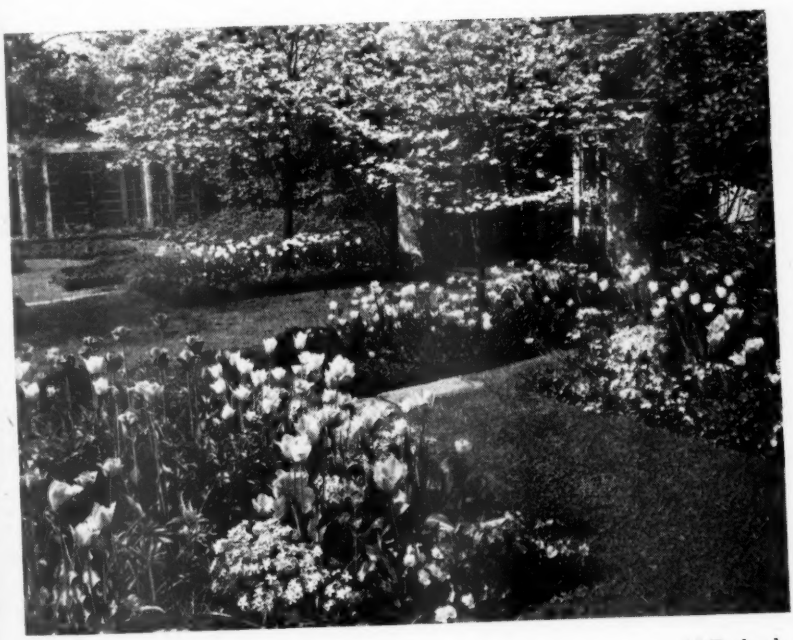
WHILE the European continent was in the throes of its greatest war, later called the Thirty Years War, some regions prospered temporarily and formed havens of liberty and scientific pursuit. The Netherlands, then a world power, were the America of that age where liberalism ruled and where the persecuted scholars could get their books printed. The wealthy merchants, whose ships sailed the oceans with precious cargo, were in touch with the entire world. So it happened that the tulips which grew wild in Persia and in parts of Europe and which had long been cultivated in the gardens of Turkey found their way to Holland in the sixteenth century. Seed was bought in Turkey, often at great expense, and the original bulbs which grew from those seeds, usually within four or five years, developed a marvellous variety of shapes and colors. Some combinations of color and form appeared rarely and were accordingly much in demand—a wonderful opportunity for speculation! A great trade in futures started and the craze of speculation made rich people poor and poor ones rich. The business was conducted like pre-depression stock exchanges, everybody selling short. Nobody had the rare tulips he "sold" and when the time came to deliver he had to pay extortionate prices to the owner of an unusual specimen or go bankrupt. The government stepped in and set up regulations forbidding short-selling. How much a speculator offered appears from one account: There were but two *Semper Augustus* in the market and a trader offered 4,600 guilders, a new carriage, two gray horses and a new harness for the one bulb he had to have. We turn therefore with relief to the catalogues of our day.

There are several groups of tulips offered, Early, Breeder, Cottage, and Darwin, and the quite worthwhile Species tulips. The early tulips, which usually bloom in March, are low-growing and derived from some of the species that produce flowers before the crocus, especially the downy stemmed *Suaveolens*, sold as *Duc van Thol*, with scented scarlet flowers that have yellow edges; and from the *Kaufmanniana*, also called Water-lily tulip, which is a soft yellow tinged with carmine. Of this species, varieties have been bred which range from creamy white to rosy purple. The *Clusiana* or Lady tulip, white with crimson, also fragrant, is a bit later, but also a low-growing tulip whose qualities are incorporated in the early tulips.

The Breeder, Cottage, and Darwin tulips flower in late April and during May. They are bred from the Gesneriana tulip for perfection of flower and long stems. Like the irises and other cultivated garden plants, tulips are constantly being hybridized to get taller and taller stems. Whether this is an altogether desirable tendency with tulips, which after all have but little foliage, is a matter of taste. But among these three classes you will find the majority of the tulips that are offered for sale, with all the colors present in tulips. Tall yellows are, how-

Clusiana Tulip, Mertensia, Viola

McFarland



Tulips and Dogwood

McFarland

ever, rarer than reds and purples. As the flowers mature, their colors usually undergo a slow change and, not infrequently, "broken or mixed" colors appear, though these three groups of tulips are in principle "self-colored" or uniform.

A tulip has usually six sepals; but many doubles occur and, not infrequently, flowers with eight sepals make their appearance. One is borne on a stem. In colors, the heritage of the *Gesneriana* tulip predominates in our common garden tulips; the reddish and purplish varieties derive their color largely from this tulip, which is without fragrance, as are most of our garden tulips.

The relatively more expensive bulbs are those which embody both purple and yellow and have therefore brownish tints. While the old-fashioned tulip bed was dominated by yellow tulips streaked with red, the modern tulip plantings have a predominance of red, pink, and purple or self-colored yellows. But since the growth habit of the tulip is such that you can admire each one by itself, I am inclined to give some preference to the mixed colors which are always interesting and surprising. The mixed colors are classified by the trade according to old Dutch terminology into "bizarres," which have a yellow ground marked with purple or scarlet of different shades; the "bybloems," which have a white ground marked, lined, striped or variegated with violet or purple; and the "rose tulips," which are white with rose or crimson variegation.

When confronted with a list, you will want to order many different kinds. But it is not always easy to handle a tulip bed, because, different from daffodils, they do not lend themselves to deep massing. A long border is therefore ideal. As you walk along it, you admire the different individuals separately, perhaps occasionally bending down to hybridize two exceptional plants, but always drawn on to see the next beauty. Give *Clusiana* and *Kaufmanniana* a trial; they are inexpensive, take little room, and look excellent with grape hyacinths or even blue crocus. If you plant a row of mertensias or Virginia Bluebells behind these tulips, you can serve two purposes—their amethyst-colored flowers will also be a good contrast to the daffodils which you may plant still farther behind them. Further back then, there are Peonies, Day-lily, Hosta (*Funkia*), and perennials like the old-fashioned self-colored columbines, which will attract the eye when the bulbs give out.

A long row of tulips can be easily broken by groups of hyacinths, set against yellow daffodils. If you are equipped to keep carnations through the winter (a matter of making cuttings in fall and keeping them in a cool, unheated room until you can put them out to bloom in early June), you have an excellent follow-up in this long border. If you cannot take this trouble, there always is the unsurpassedly faithful ranunculus to bloom for you in late May; an occasional Lychnis or Silene will make pleasant contrasts. Other possibilities are the planting of petunias between the small tulips whose leaves will have died down by early June when the petunias start flowering, and a sprinkling of Shirley poppies between the taller tulips and daffodils. This may be done before the last frosts so that you get graceful poppy heads waving above the foliage of the bulbous plants in May. Clarkias are also suitable to sowing right into the open amidst bulbs. For you must not cut off the leaves of bulbous plants lest next year's flowers will become small or not develop at all. Thus it is best to plant quick-growing annuals between the bulbs, partly because they do not root deep and will therefore not make much competition, partly to cover up the dying of the bulbs.

(*To be continued*)

The Organic Doctrine

By J. I. RODALE

Second Installment of Speech Delivered to the School Teachers of Allentown, Pa. On May 29, 1946.

THE soil is not a dead, inert substance. It is very much alive and teems with such micro-organisms as bacteria, fungi, molds, yeasts, protozoa and algae. As a group, these lower plants and animals are referred to as the biologic life of the soil. In a richly fertile earth the amount of bacteria in an acre may weigh as high as 600 pounds and when they die their decaying bodies turn to humus and further enrich the soil in a safe, organic manner. 600 pounds of any kind of fertilizer substance per acre is a substantial amount. In some cases only two or three hundred pounds of concentrated chemical fertilizers are applied per acre.

These tiny living organisms are part of the digestive processes of the soil. They are the wrecking crews that turn anything with which they come into contact into soil, even rocks. What a marvelously integrated system God through Nature has wrought in this subterranean world of microscopic, specky beings. It is breath-taking to behold the beautiful interplay of natural forces and the biological activities going on in old Mother Earth as these gleams of life go about their task of manufacturing plant food. Without the aid of this mirco-organic world man would cease to exist.

Along comes your scientific agronomist, who should know better, but who recklessly throws a monkey-wrench into this microbial universe, by dousing it with strong, corrosive chemical fertilizers. He believes that the conveyor-belt method must be introduced into every aspect of farming. He even applies it to cows who wearily yield five times the quantity of milk Nature intended them to, only to discover that it contains less vitamins than the milk obtained in smaller quantities from scrub animals.

The scientist sits in his ivory tower. People take off their hats when they talk to him. He invests himself in a phony cloak of omniscient authority. Nature is beneath his dignity and can safely be left out of consideration. But something peculiar occurs in this biological underground. The population decreases alarmingly. Let me quote from a recognized authority, Sir E. John Russell. In his book *Soil Conditions and Plant Growth* he describes a study which was made in a field treated with farmyard manure. It had a bacterial count of 28,860,000 per gram of soil. Where chemical fertilizers were used only 15,100,000 bacteria were present. Practically all investigators agree that the application of organic manures stimulates and increases the biologic life of the soil.

There is another startling aspect of the operation of this microbial world in the soil which I am sure you will be surprised to hear about. I have reference to the penicillium mold which has recently made headlines in medicine. Penicillium is an old organism, much older than Methuselah, and originates in the soil. It has been there ever since time began. Along with other, perhaps dozens, of similar organisms in the soil it acts as a police agent to subdue dangerous microbes.

There are thousands of species of bacteria, molds, etc. in the soil. Some are friendly. Others are extremely dangerous. Of 1,000 species of bacteria isolated by the Society of American Bacteriologists, 100 have been classified as pathogenic, that is, capable of bringing about disease in plant, animal or man. These are bandits who would make war on plants were it not for such police forces in the soil as penicillium which Nature has developed specifically for such purpose. She has other similar police organisms which the medical profession is gradually harnessing, such as streptomycin, gramicidin and thyothricin. There no doubt will be discovered dozens of others. The doctors have now become soil conscious insofar as looking for organisms in it that can cure human disease, but they are overlooking the more important fact that in the condition of the soil in which penicillium resides lies the secret of general immunity from disease. If the doctors would see to it that our food is raised in soil rich in humus as well as in the pencillium-type organisms there would be less need for using penicillin as a curative agent for human disease. The use of chemical fertilizers and poison sprays evidently interferes with the smooth operation of the microbial life in the soil. Not only does it reduce their numbers but it gives rise to the wrong kind of organisms. It brings into being a situation with which the little policemen of the soil cannot cope. They function at a lower ebb. The bandit elements run riot. Disease begins to stalk on the stalks.

The famous Professor Selman A. Waksman of Rutgers University who isolated the above-mentioned organism, streptomycin says, "Plant deficiency diseases are usually less severe in soil well supplied with organic matter, not only because of the increased vigor of the plants but also because of antagonistic effects of the various soil micro-organisms which become more active in the presence of an abundance of organic matter." (*Humus*—Williams and Wilkins Co.). Isn't this exactly what I am trying to prove? Our hat is off to Professor Waksman because he is the first agricultural scientist in America to see a connection between the soil and human health, although he tells me he believes in the use of chemical fertilizers.

There is a striking analogy between penicillin and the sulfa drugs which illustrates the principle that differentiates the use of organic matter as against chemical fertilizers. Penicillin is organic matter. It is a living substance secreted by the penicillium organism. The sulfa drugs are high-powered synthetic chemicals. Penicillin works its way harmlessly through the body without leaving a signature, but this cannot be said to be the case with respect to the sulfas. They have been known, in the process of curing one condition, to seriously injure the kidneys and other important organs. There are many bodily situations where either penicillin or sulfa will cure. In such cases demand penicillin.

Nature often makes use of a phenomenon called the *Mycorrhiza Fungus* which seems to completely have escaped the attention of most agricultural scientists. Biologists in the past have noted that the roots of many plants were "infected" with microscopic fungi. Commonly these were considered harmful, that is, parasitic or competitive, but research by botanists has revealed that these fungi serve the host plant in a remarkable way and are in fact indispensable to its well-being. These *mycorrhiza* seem to live in a symbiotic relationship with the roots, a sort of partnership. They are not a parasite for they give sustenance to the roots in the form of water, minerals and organic matter.

Doctor Rayner, of Bedford College, London, a *mycorrhiza* specialist, has worked in close association with Sir Albert Howard, and they have discovered a fact which is generally not known by botanists and that is, that in the final growth process the fungous threads of the *mycorrhiza* are digested and consumed by the plant through the roots and thus plays a

significant role in the nourishment of the plant. Sir Albert Howard discovered that where plants were grown with artificial fertilizers the *mycorrhizal* relationship was either absent or poorly developed and that in the final growth the *mycorrhiza* was not consumed by the roots. Every indication of their research pointed to the fact that only where the soil is rich in humus will you find well-developed *mycorrhizas*.

Some years ago while Sir Albert Howard was traveling through the grape-growing regions of France, he was on the lookout for healthy growing vines similar to those he had seen flourishing in Central Asia. After a long search he found some and wasn't surprised when he was advised that no artificial fertilizers had ever been used there and that they had an extraordinary reputation for the quality of their wines. He examined some of the roots and found that they were rich in *mycorrhiza*. Like the Asiatic vines, also cultivated with farmyard manure, they were free from disease.

I have discussed this amazing *mycorrhiza* mechanism in many articles and in *Pay Dirt*. As yet not one negative voice from any source has been raised to question it. I have discussed it in several speeches made to school teachers organizations and in each case the biology teachers present accepted it with hearty enthusiasm. In his book *The Agricultural Testament*, Sir Albert Howard said that "on the efficiency of this *mycorrhizal* association the health and well-being of mankind must depend," but the scientific agricultural world continues to ignore it, is willing to leave it in the purlieus of the biology class-room for academic study and discussion. A Government entomologist who is tearing his hair out because a certain insect is ruining a crop ought to know that the *mycorrhizal* relationship is one of the factors that may be at the bottom of it. A cancer research project should study its possible relationship on the general health of the human body and thus keeping its cells from running wild. The fruit orchardist must study the *mycorrhiza* because experimental work has shown that it is a most vital factor in the growth of trees.

We next come to the significant part that the earthworm plays in the workings of the soil world. This lowly and generally despised creature aerates the soil as its body burrows into the ground, sometimes to a depth of six feet and more. It is nature's plow. It pulverizes the soil by eating it and ejecting it as castings. Thus is topsoil produced. Aristotle referred to it as the intestines of the soil. Without its aid soils would be relatively hard-packed and would suffer hardening of the arteries. Without them the bacteria and moulds would be less efficient because earthworms bring about a condition of airiness, and a reduction of acidity which aid microbes to multiply. In other words the earthworm and the bacteria act as a team.

About 1881 Charles Darwin, of monkey fame, brought out a book with the scholarly title of *Vegetable Mold and Earthworms* which was the result of years of observing the habits of the earthworm and the part it plays in soil fertility. His work indicated that without the earthworm vegetation would degenerate to the vanishing point. Darwin estimated that more than ten tons of dry earth per acre annually passed through the earthworm's digestive system, so that practically all top-soil was treated by them every few years. He discovered that in a fertile field well populated with earthworms, they would produce an inch of new topsoil every five years. They also destroyed the larvae of many noxious insects.

Unfortunately, in connection with the name of Darwin, the public could think only of evolution and monkeys. His earthworm book yellowed and mouldered on library shelves for over fifty years, before it was recently rediscovered and brought to light. The agriculture professors certainly did not make Darwin's earthworm treatise a part of their curriculum. When a farmer encounters a worm he steps on

it, not realizing it is his most valuable friend. By using chemical fertilizers he kills and drives them away. There are fields on which large quantities of chemical fertilizers and poison sprays have been used on which you won't find a single earthworm. These fields will produce food crops, but they will not be of a high character nutritionally.

So we see that in the triumvirate of the soil's government—bacteria, mycorrhiza and the earthworm, the use of chemical fertilizers is an inhibiting influence whereas the application of organic matter, their natural food, helps them function and multiply healthfully.

The science of chemical fertilizing dates back to the year 1840 when the famous German chemist, Liebig performed a defective experiment in which he burned a plant, thus destroying all its organic matter. In the residual ash he discovered that the principle ingredients were phosphorus and potash. He knew that he had burned up the nitrogen, so he reasoned, therefore, that since these elements were the main constituents of the plant, all it needed as food to make it grow was nitrogen, phosphorus and potash, known as N, P and K. Now, if the human body is burned up, its ash will be found to be similarly rich in these chemicals, but does that mean that we should take it in chemical form? Of course not. We can get our N, P and K in ham and eggs and in vegetable soup. In the same manner, the soil should secure its NPK from living, organic foods, not from dead chemicals.

There is a science called chemistry which has a valuable place in our civilization but which has been wantonly overstressed in agriculture. Because of this fact, the agronomists have carelessly overlooked the biologic aspects of soil fertility. If you try to act the chemist in growing crops you may become snarled and confused in the simplest matters. For example, Russell, in his book *Soil Conditions and Plant Growth* shows that many of Liebig's ideas were entirely incorrect. The ash does not give a correct measure of what the plant needs. Turnips, for example, seem to need phosphates, yet their ash shows very little of this element. Chemical examination of soils does not seem to give a true measure of soil fertility. Two soils may seem to be identical in chemical analysis, yet the yields of their crops differ radically. For instance, tobacco is rich in potassium when it grows in a soil poor in potassium. The wood and bark of oak trees are especially rich in calcium, tests showing that the ash of the bark contains up to sixty per cent of calcium oxide, yet they can grow in sand, a type of soil extremely poor in calcium.

An incident recently occurred at the London aquarium which shows how dangerous a chemical analysis can be. It seems that a consignment of salt-water fish were brought in and there wasn't sufficient sea water available for them. One of the curators said he could make sea-water, since all the ingredients were known. He got out his book, assembled the materials and made the water. But when the fish were put in they died. When a tiny pinch of real sea-water was put in, the fish could live.

Evidently, then, sea-water has a minuscule fraction in it, a spark, a gleam, but something that is absolutely vital to the life processes of an ocean fish. It shows that science doesn't know 100% of the formula of matter. There are hidden elements. It is exceedingly dangerous to operate with only 99.99% of a formula. The unknown one-hundredth of one per cent may pack dynamite. There is a similar unknown substance in manure, weeds and leaves which the NPK formula cannot possibly take cognizance of, but we are sure it is in it, just as we are sure that sea-water contains it. Dare we operate our farms, in producing our food, without it?

It is this baffling, unknown portion of matter that has prevented scientists from making living matter in the laboratory and I don't believe they will ever be able to make it. Alexis Carrel

with the aid of Lindberg has kept a chicken heart alive for a considerable period after the animal had died. Scientists can make bacteria multiply, but they cannot produce a bacteria from chemical ingredients. As far as they are concerned they can get a bacteria only from another bacteria. Only God can make an enzyme.

The scientists are guilty of aiding and abetting big industry which was quick to exploit the work of Liebig. It enabled them to turn into immense profits the up-to-date worthless chemical wastes of the smelters, steel plants and gas works. Science did not make exhaustive experiments to study out the hidden weaknesses of chemicals as a fertilizer. True it seemed to enhance the yield, but how about its effect on hard-packing the soil, killing off valuable soil organisms, increasing the hazards of erosion and undermining the health of the people? The chemical industry snatched up this new baby so fast that it must have taken the scientists' breath away. Never before had the work of the laboratory been so eagerly adopted by industry.

And it is this gargantuan chemical industry which will fight hard before it will give in. Through congressional lobbies it may railroad through legislation that might make compulsory the use of chemical fertilizers, especially since the Government itself is in the chemical fertilizer business, manufacturing superphosphate as one of the by-activities of the TVA. Already in the state of Oregon, there is a law recently enacted which requires every cherry-tree to be poison sprayed, even if it happens to be only one back-yard pet, otherwise it must be chopped down. One of the readers of *Organic Gardening* Magazine wrote in stating he would chop down every one of his trees before he would see them poison sprayed, and he has over fifty. That man's trees do not require the protection of these sprays because they have not been abused with chemical fertilizers. They have been fed the natural compost which gives them the strength to ward off disease. How did they get the fabulous fruits of Biblical days? Surely not with chemical fertilizers and poison sprays. How do the Hunzas grow their choice fruits, including the apricot which is their main article of food in the winter-time? Certainly without chemicals of any kind. We know that.

Oregon, the State that has imposed this drastic law on an unsuspecting and slumbering public, happens to be one of the worst offenders in the use of poison sprays. In some parts of that State, the soil has been so poisoned that not even weeds will grow in it. This is the ultimate effect of the destruction of the soils natural condition of fertility by the use of strong chemical fertilizers. Evidently the leaves of a tree growing in such soil are sick in a mild way, and have a peculiar taste that attracts insects. You will find no *mycorrhiza* on the roots of such trees. The Oregon agricultural authorities recently issued a bulletin describing how to restore these orchards, which they refer to as "ex-orchard soils". How about issuing a bulletin describing how to bring back the health of persons who have become sick from eating apples with poison spray residues, that come from such soils?

In Nova Scotia there is an agricultural magazine called The Annapolis Valley Post Road in which *Pay Dirt* has been running in serial form. In the introduction to the series the editor said:

"It is quite clear that there is something fundamentally wrong with the methods used in growing apples in the Annapolis Valley. For example, the long keeping winter varieties such as Northern Spy have been gradually changing their character over the past twenty years and have now definitely lost the durability for which they were once famous. The same trend has been noticed in the fall apples. Their keeping quality has been progressively impaired.

"Further, the battle against predatory insects has been a losing one.

Spraying apparently begets more insects than it can control."

If you have read Pleasant Valley by Louis Bromfield you might remember the reference he made to a friend of his, a horse breeder, who was experiencing considerable trouble with his horses. They were degenerating. Many deaths were occuring in births. In desperation he sent to England and secured the services of a man trained under Sir Albert Howard. Now they are growing their horse feeds without chemical fertilizers. My brother Joe recently purchased a 100 acre farm for the purpose of breeding Arabian horses. This is being operated on a strictly organic basis—no chemical fertilizers. The horses are fed on crops raised with composts and such mild fertilizers as raw ground phosphate rock and limestone.

The medical profession and the public are fast asleep on the question of how their foods are raised and its effect on their health. I say "their" because I have removed myself and family from this classification in regard to the food we eat, by growing our own. There are thousands of others who are doing likewise through the efforts of Organic Gardening Magazine in spreading these teachings. Many farmers are going to be caught fast asleep, just as some stage coach companies were choked out when the railroads came in. But in our offices every day we see evidence of more wide-awake farmers who are changing over to the compost method. One day last week, an unusual day I would say, there were six letters from farmers stating that they were going to start. Several of them were farms of about 150 acres. The signs look good, but progress will be slow.

Do You Want To Help the Organic Cause?

WE ARE WORKING on a plan to enlist the aid of some of our readers who have the time to distribute our subscription-getting booklets and bring our message to an ever-widening circle. To those who are interested we will send a packet of booklets. Each booklet contains a coupon and a means of identification so that when a subscription comes in we will know through whose efforts it was, and will pay a liberal commission for every such subscription.

You can give them out to friends who do gardening or farming. Perhaps some friendly seed store, or church will aid you, or a garden club. Just give the books out—you needn't give them a sales talk, or follow them up. The booklet tells the whole story.

Within a month, since we have put this plan into effect, the efforts of reader-subscribers has resulted in our receiving 259 new subscriptions. Others who have spread our message with this easy plan have turned a few minutes of their spare time into handy spending money. Perhaps you can do the same.

Write for full details to Organic Gardening—Dept Q, Emmaus, Pa., and state whether you want 25 or 50 booklets.

Early New England Land Culture

By H. C. GAUSS

WHEN the English took up the cultivation of the soil on the shores of Massachusetts Bay, they found exceptionally favorable circumstances because of the great depth of fertile soil resulting from glacial deposits.

For the unknown number of generations during which the Aboriginal red men cultivated Indian corn, "pompions", and other food stuffs on these rounded hills or "drumlins", soil fertility was continued by the Indian practice of "fishing" the soil. This practice which was made possible by the great supply of shad and herring (alewives) far beyond the food requirements of the Indians was imitated by the white man and from the time of the Plymouth Colony to 1639 or something like a score of years in the earliest Colonial period, two or more fish to every hill of corn, or, as the practice was in 1637, a thousand fish to the acre gave a yield of triple quantity over that of fields not manured.

With the increase of food demand, this diversion of fish foods was found to be uneconomic and the General Court ordered that after June 20, 1639, the better food fishes, bass and cod, should not be used for manuring except as to their heads and offal.

That shad, herring, porgies and other of the more bony fish continued to be used as manures is indicated by the order of the town of Ipswich, Mass. on May 11, 1644, that all dogs should have one leg tied up. If a dog broke loose and went to scraping up fish in a field, its owner paid a fine and compensated for the damage.

As the fish were not pre-composted, there seems to have been the practice of "fishing" a field only once in three years, emphasizing the fact that release of the elements of organic compounds by decomposition is essential to the usefulness of such materials in the increase of vegetable growth.

By 1834 suitable fish for manuring had become scarce in Massachusetts Bay and the streams where shad and herring had formerly resorted in great numbers in the spawning season. By that time the increase of animal life on the farms was sufficient, with the gathering of waste materials in middens according to the traditional European practice, to provide a more convenient manurial means but fertilization with fish maintained its vogue in the Chesapeake Bay Country and tidewater Virginia and still nominally exists in the advertised "fish fertilizers" which are supposed to contain, besides the usual loading of sand with N. P. K., some proportion of the wastes from the rendering plants producing fish oils.

An annalist writing a hundred years ago about the husbandry of these formerly "fished" farms says "The impression is entertained by no small number of our yeomanry that by cultivating their ground as long as it will bear with a moderate supply of manure they realize more profit than by different management. But others neither think nor act so. Experiment evidently decides in favor of the latter class."

The "vicious land-mining practices" (Pay Dirt p 240) have brought about in only a few generations the result of "soil stripping" a major step toward turning these former fertile fields into what may come to be called "the desert areas of Massachusetts". Because farms no longer pay, the topsoil is stripped off to promote the growth of grass on city lots rough-graded with the debris of house construction. The underlying gravel and sand are trucked away for road and other rough-grading work so that unsightly clay pits are left where a nation has grown a large proportion of its food through three hundred years of what has been supposed to be the top flight in agricultural instruction, advice and supervision.

Reader's Correspondence

Send stamped self-addressed envelope for reply.

Visitors to Organic Gardening Farm welcome. — Closed on Sundays.

TURNING THE HEAPS

Q. Can adequate compost be made without turning?

C. C. C., Chicago, Ill.

A. Mr. J. I. Rodale has experimented with this question extensively and found that a box of his earthworms added to a large compost pit resulted in perfectly broken down compost material. This success was so startling that he recommends the use of earthworms for this purpose wherever large amounts of compost are to be made and where therefore the labor of turning the heap should offer difficulties. As you perceive from the above description, you turn over the job of turning to the earthworms. But if you did not do this, aeration would soon be impeded and the full decomposition would be left to the anaerobic bacteria; this would mean that less heat is generated and that the disease organisms, weed seeds, pests, etc. on the outside of the heap would not be fully destroyed. To counteract this, you would have to let the heap sit for much longer periods which would lead also to a loss of nitrogen. The best method is to combine pits, made of stones or hollow tiles, with the earthworm practice where hand-turning is to be omitted. The pits prevent drying out and loss of heat on the outside of the heap. On a farm scale where weed control is a less serious problem than in the garden, this method should indeed prove fully adequate. But since earthworms do not destroy many weed seeds and since heating is essential, it may be well to be a bit liberal with the manure to ensure quick and adequate heating.

GLADIOLUS BULBS

Q. I have had some losses from gladiolus bulbs stored in our moist Northwest outside the house. Would you recommend storage in heated rooms?

N. P., Seattle, Washington

A. Gladiolus bulbs are natives of the hot regions where they are exposed to a rest period of extreme heat and drouth. If grown in a moist region of relatively cool climate, they will not be fully successful unless given, at least temporarily, conditions similar to their native home. Just as fruit trees that require a cold and even freezing rest period, because they originated in cold regions, will not produce in the warm regions, plants of the South will fail or decay or at least ail in the North if not given their warm rest. I see no reason whatsoever why you should not keep them for a couple of months in a warm and dry room.

—o—

AMARYLLIS BLOOM

Q. For two years now I have ordered amaryllis bulbs, planted them according to the printed advice of the grower, and seen them start into a growth only to be quickly disappointed. They made two large and weak leaves. but no flowering stalk at all. Several even failed to produce leaves, they stayed firm and healthy, made a few roots, and stopped. Should I keep on watering them and get them to produce later or should I rest them for the time being? What do you advise on this problem that has me puzzled and aften angered? I love

amaryllis flowers more than any others and feel that this is a personal challenge which I cannot meet.

M. J., Tacoma, Ohio

A. Many of our amaryllis bulbs, occasionally called hippeastrum, are grown in the Northwest where moisture conditions are by no means ideal for these plants which want a warm summer. When they are shipped, they have fleshy roots and are not really fully dormant. You plant them according to directions and keep on watering them until most of the old roots are decayed or you underwater them until the roots are shrivelled up. Instead of getting good leaves, you get a flower which exhausts the bulb, and the poor root system produces only weak leaves. This series of troubles is probably further emphasized by indoor conditions, which inevitably are too warm at first. Amaryllis bulbs should be started at about 60° F., but this temperature is hard to find in the average house and certainly on the average window sill. Those which have not sent forth either flowers or leaves are probably your most promising bulbs since they experience a protracted rest period. If they were soft, they would be poor, but since they have remained firm you can look forward to a good bloom when they resume active growth. Keep them on the dry side lest your soil become sour and give them some compost water or liquid manure when they begin to send up the flowering scape or leaves. The large leaves you mention may be due to the variety. Perhaps those are amaryllis longiflora, though not necessarily so.

—o—

FALL-FLOWERING CROCUS

Q. I am told that the fall-flowering crocus is highly poisonous. If so, what protection is necessary in order not to damage other plants?

Mrs. F. L., South Bend, Nebraska

A. Colchicum autumnale, often called the fall-flowering crocus, is a plant that has caused cattle poisoning in

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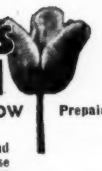

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regions where it grows in the wild and where cattle have not learned to be on their guard. An extract of the bulb is used by plant breeders to produce injuries to the reproductive process of the plants and to suspend full consummation of the merger of male and female elements, thus leading to a doubling of the carriers of heredity. But there is no indication that the growing plant affects other plants growing near it and you may safely plant these bulbs. It is not likely that you will confuse it with any other since it looks considerably different from edible bulbs.

—o—

KITCHEN WASTES

Q. As a new subscriber I may have missed out on some advice you have concerning the value of kitchen wastes. What can I use of the things left over from the kitchen?

E. M. M., Irvington, N. J.

A. All kitchen wastes can be used with the exception of soapy water and fat. Soapy water contains dangerous chemicals, especially soda, which is not good for most plants. Only beets like it well. Fat, besides being an attraction to ants, does not break down very well and had best be used elsewhere. That leaves us with garbage of all kinds, scraps, bones, etc. Large bones will gradually decay in the ground and supply it with phosphorus, but unless ground up they will not add much immediately. Since there is no inexpensive grinder for bones, I suggest that bones be piled under fruit trees where they may lie and weather until they are broken up. Covering them a little with compost, a straw mulch, or even a stone mulch will help their breaking down. The other kitchen wastes had best be thrown into a garbage pit. Pit or pile should be occasionally watered and covered with earth to speed up decay and to prevent fly trouble and odors. When then you have enough green matter collected, you can use this half-decomposed garbage as an excellent activator. De-

pending on how much animal matter may be contained, your garbage will be more or less rich in nitrogen. Hotel garbage, leftovers from mess halls and army camps are noticeably richer in meat scraps than private kitchen wastes and are therefore rich enough in nitrogen to supply all the animal matter needed to stimulate bacterial growth. But lean private kitchen wastes are low in nitrogen and you will therefore have to use a few bags of poultry manure or similar sources of animal matter to get a good compost heap.

—o—

PLANT AND ANIMAL MATTER

Q. Kindly restate the principles underlying the mixture of plant and animal matter in the compost process. I realize that living things like bacteria require energy and growth food or carbohydrates and proteins just as we do ourselves. What else is there involved?

Mrs. J. P., Brewster, N. Y.

A. You have stated the most essential fact. Another point has recently been made in the magazine with respect to the hormone content of animal manure, which makes it the best source of nitrogen. There is moreover the actual bacterial content of manure which produces such action in the compost as activators are expected to supply. The important thing is however the proper proportion. Both Sir Albert Howard and J. I. Rodale have experimented with different materials and found the 1:3 ratio of animal matter to plant matter the sound one. If you used, let us say, a hundred pounds of rich hoof and horn dust which would amount to perhaps 15 pounds of nitrogen with three hundred pounds of plant matter to get full action, there would be too much growth food and too little energy food for the growing bacteria and the horn dust would not be digested. As a result, much of it would go off into the air, some would attract flies, since in the absence of plant matter bacterial growth would be

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stopped and heating decreased, and the resulting material would be a crumbly cake that would have to be diluted with humus in order not to burn tender plant roots. Since this has to be done sooner or later, it is naturally best to do it right in the compost heap and to save the expensive and valuable nitrogen to the fullest. The ratio 1:3 is based on barn yard manure. To translate it into terms of other animal sources, you have to consider their nitrogen value. A guide for this process is in preparation in Dr. Meyer's forthcoming booklet *Organic Fertilizers*, soon to be released as an issue in the *Gardener's Book Club*. For the moment I should say that you had best apply richer materials like dried blood and horn dust in thin sprinklings or better yet after having stirred them up in a bucket of water.

—o—

HEATING IN COMPOST

Q. What is the cause of heating in compost? How often does a heap heat up?

Dr. R. V., Houston, Texas

A. Heating is the direct result of bacterial growth and activity. As bacteria grow and break down the heap, especially the plant matter on which they feed primarily, energies are released similar to those that you know from your laboratory work with different compounds. The factors that control bacterial growth are the factors that control heating. 1. Proper amounts of plant matter. 2. Proper supply of nitrogenous matter, usually of animal origin. 3. Air supply. 4. Moisture. 5. Acidity. 6. Contact. In a freshly built heap, there is much air and the layers or sprinklings of earth, but particularly the outside covering with earth produce contact and make it possible for the water to permeate all the material. When that happens, heating develops usually up to 150-160° F. Then a new contact has to be established which is accomplished by turning the heap and thereby mixing the material more intimately. Now the heap is already more closely packed and water, nitrogenous and plant matters come into better contact. The heating therefore resumes and reaches usually 160-170°. The heap is decomposed and shrinkage will be noticeable. The second turn will produce another spurt, but then the contact becomes so intimate that air becomes excluded and that anaerobic bacteria and fungi take over. No further heat will be developed.

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ROSES AND STRAW MULCHES

Q. Do you advise the use of a straw mulch with roses? It occurred to me that roses are related to our fruit trees which are said to benefit greatly by mulching.

Mrs. A. A., Cape Cod, Mass.

A. This is a complicated question that requires a complete answer. The roots of roses do not reach so deep as the roots of fruit trees. A straw mulch may therefore unbalance the soil nutrients as it decays under bacterial action. For the bacteria will tie up the nitrogen that may be present in the top soil and the roses may therefore slow down in their growth. In regions of severe winter killing that might occasionally prove quite desirable. Wherever a good growth is wanted, it will however be better to mix the straw with finished compost or to make first a compost mulch before adding the straw mulch. There is another point to be made, the quality of the straw. If you have fresh straw, all the above difficulties are emphasized. If you have straw from a stack that has broken down in the field, largely through the action of fungi, the problem is simpler. I have used such straw with grapes as well as with roses and fruit trees and found invariably that the plants were healthier than other plants not so treated. I have usually incorporated a forkful of such fungus-rich straw right near the roots and have, upon examination, found that mycorrhiza were formed on the plant roots. As you know, these mycorrhiza assist the plant in its nutrition. The same or a better effect can be achieved by the use of leaves from the woods, probably because they result in a more acid condition than straw supplies to roses, which are fundamentally lovers of raw humus which is acid.

—o—

WILLOW SAWDUST

Q. If I can sell my compost for $3.00 per yard, is willow sawdust

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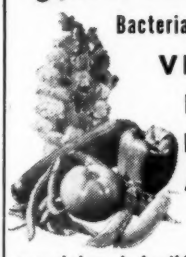

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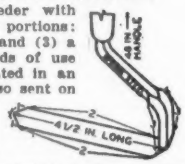

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W. B. N., Boulder, Colo.

A. Since your letterhead shows that you are the Manager of a Landscape Service, you will wish to supply your customers with a balanced compost. Willow sawdust is usually richer in minerals than the sawdust of other woods, since all plants growing in moist soils collect greater amounts of minerals than plants grown on dry soil. Willow sawdust also breaks down easily since there are no resins to counteract or deter bacterial action. If therefore you can supply enough nitrogenous matter to get good heating and shrinkage, there is no reason why willow sawdust should not be used in greater amounts than softwood sawdust. I would, however, not use more than 8-10 per cent of the volume even of this material, so that you get a well balanced compost derived from different sources. The best way of testing your own product is by actually growing a few different plants in it to maturity. If upon mixing your compost with average garden soil your plants stay stunted and later develop yellow leaves, you will see that the material lacks nitrogen and perhaps other elements. In that case you can correct the product by recomposting it with some poultry or cow manure or some other nitrogenous material. On that basis a yard of willow saw dust might be worth 75 cents delivered.

—o—

LEATHER DUST

Q. Some of my customers who are oldtimers in gardening often ask me if they cannot use leather dust which I collect from my machinery. There is a large amount of rubber mixed in with the dust and I also fear that leather is chemically treated.

L. P., Providence, R. I.

A. While rubber will not decay sufficiently, leather dust will, which shows that the bacteria act upon it and eat it up. The chemicals used in making leather do no harm, but the nutritive

elements in leather may do a great deal of good. Your customers can probably screen off the rubber parts and then just apply the leather dust. You will be surprised to learn that a hundred pounds of leather dust contain as much as 12-15 pounds of nitrogen or as much as a ton of manure. It is true that this nitrogen does not break up so quickly and that manure has other valuable elements that leather lacks, but I should by no means discourage the use of leather especially in dust form. But I should add some manure too and thereby not only stretch the effects of the leather, but also make the compost more balanced and rich.

—o—

ASTERS

Q. We can't grow asters here on account of wilt; we have wilt resistant seed, is there anything you could tell us on how to grow them?

Miss H. H., Milwaukee, Wis.

A. The best way to raise asters is to start them in flats. You can use a loamy soil for them and not water the flat too much; otherwise, you will lose the tiny seedlings from damping-off fungus. As soon as the first two leaves show or even earlier, you transplant the tiny seedlings in another flat at least 2½ to 3 inches apart. This is the crucial time for asters. They need light from all sides. It is difficult to get sturdy plants in the flat if the light falls in only from a window. If you cannot supply light from above, it might be better to rely on plants from a nurseryman because plants grown in half shade are apt to get leggy. After first watering the seedlings well keep them on the dry side so that they make a slow and sturdy growth. After danger from frost, you set out those plants in the open; and I would advise again that you use land which is not too rich and not wet. Asters are of many varieties and species, but the ones you refer to are of Chinese and Japanese origin and do not like lime in the soil.

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Another possibility is to sow the seeds into the open after danger from frost. You will lose a good many seedlings, but a number will come and produce good flowers. If you cannot grow Giant Crego Asters, of which the Early Giants will probably be the most suitable for outside growing, you had best rely on the hardy perennial asters which are quite attractive too.

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